

# PEEP Family Science: What We Learned Developing Media-Based Preschool Science Apps

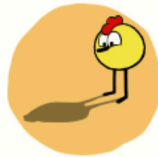
By Borgna Brunner



Colors



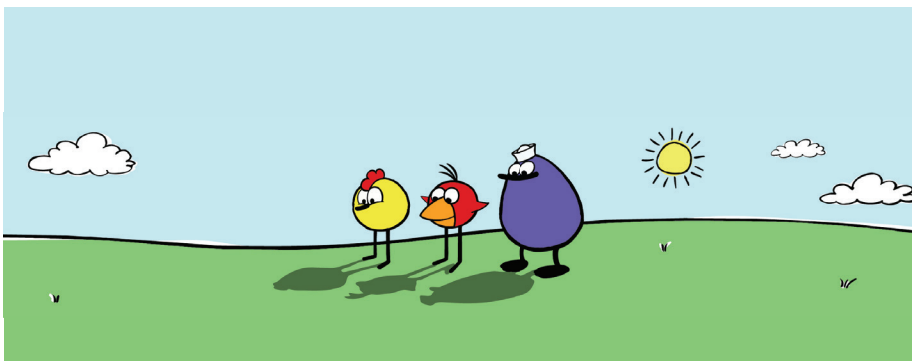
Ramps



Shadows



Sounds



Top: Icons show the four science topics covered in the PEEP Family Science apps. Above: PEEP characters Peep, Chirp, and Quack, learn about shadows by observing and asking questions. Images courtesy WGBH Boston

PEEP Family Science was designed for parents and their preschool children to explore science together at home. Available in English and Spanish, it comes in the form of four free apps, each one dedicated to a different science topic: colors, ramps (and movement), shadows, and sounds. Featuring the Emmy Award-winning public television science program *PEEP and the Big Wide World*, the apps include animated stories, live-action videos with real children, and hands-on science activities parents and children can do together.

A three-year project funded by the National Science Foundation, PEEP Family Science was created by educational media developers from Boston's public

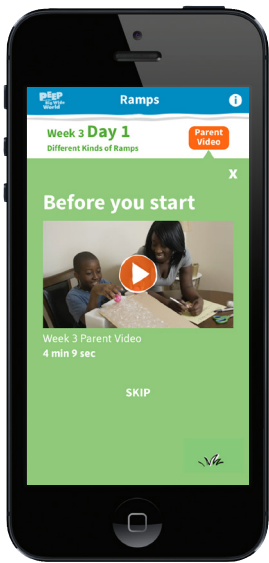
media station WGBH and researchers from the Education Development Center (EDC). It was designed specifically for low-income families who are served by the home-visiting organizations HIPPIY USA and AVANCE, which support parents whose children are not enrolled in formal preschool. The apps have also been adopted by a wide variety of educational organizations that work with young families. Awarded a five-star rating from Common Sense Media, the apps can be used by any parent interested in exploring science with their preschooler.

A major issue we confronted early on in the design and development was how families would be able to access the PEEP media. Just one-third of HIPPIY

and AVANCE families had reliable internet connections, preventing them from streaming or downloading the videos from a website. But nearly all the families owned a smartphone, so our solution was to build apps that could be downloaded by parents at their regularly scheduled HIPPIY or AVANCE parent group meetings, using the program's Wi-Fi or hot spot. Once downloaded, the apps could then be used completely offline.

We initially made the decision to choose an app format to help bridge the digital divide. But this format has also enabled us to further enhance the user experience and deepen the educational value of the content. Here's what we learned during the development process.

**1. Build best media practices right into the app.** Media can't substitute for the hands-on science experiences young children get through exploration with actual objects and materials. But media can enrich learning by using animated characters children love to model science practices and spark their curiosity about the world. The trick is to achieve a healthy balance between screen time and real time. To accomplish this, the PEEP apps were designed to always introduce a video and a hands-on activity on the same screen. This encourages families to transition directly from watching the video to doing the related science activity.



The videos for parents (in this case, on different kinds of ramps) provide a preview of the suggested activities in the app. Image courtesy WGBH Boston

## 2. Use digital nudges and video to encourage parent-child engagement.

For 3- to 5-year-olds, science becomes exciting and meaningful when their parents participate and share the experience: Research shows that young children need someone asking them questions and sharing ideas to help them think more deeply and build on what they've already learned. PEEP Family Science offers three key parent-child engagement strategies (Play and Explore Together; Ask Questions and Talk About Ideas; Explore More) that are emphasized throughout the four apps. The following design features remind parents to use these strategies:

- **Pop-ups.** The PEEP characters pop up from time to time on the screen while parents are guiding their children through the activities, offering helpful tips on using the engagement strategies. (We originally had the characters say the strategy aloud, but testing

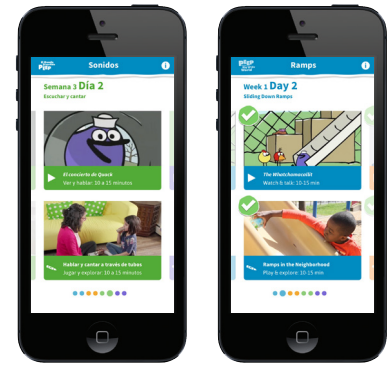


In one of the videos, the PEEP characters discover how much fun a slide can be. The suggested activity encourages families to go outside to play on a real slide.

revealed that parents found the audio a bit too intrusive; written pop-ups were more effective.)

- **Short parent videos.** These videos appear before the week's activities and show a parent and child modeling the activities and illustrating the three engagement strategies. (Apps published in the Apple or Android stores cannot exceed a certain size; given that the PEEP Family Science curriculum already featured a number of animated and live-action videos, fitting these additional parent videos into the apps took some experimentation to ensure the apps did not exceed the publishable size.)

- **3. Make the most of the small screen size.** Instructions in an app format should be simple, visual, and fun—an aid to parents who may have little experience doing science activities or who are pressed for time. The activity instructions are presented in brief, incremental steps over a series of screens. Illustrations appear on nearly every screen. Introductory music, sound effects, and a celebration screen at the end of each week of science create a playful atmosphere.



The PEEP Family Science apps for sounds (left) and ramps (right) show the Peep videos and the related activity suggestions just below. Images courtesy WGBH Boston

## 4. Use the phone's built-in tools for exploring science.

One fortuitous discovery we made was that smartphones have features that can be used for science exploration: a camera, audio and video recording capabilities, and the flashlight function. Smartphones can record loud and soft sounds, make a video of balls rolling down ramps of varying steepness, take photos of different shades of the same color, and make shadows and experiment with light and color using the flashlight.

PEEP Family Science was tested by more than 200 racially diverse, low-income families in Arkansas and Texas, in both English and Spanish. EDC's research found that families overwhelmingly enjoyed the apps and set aside time for doing science at home. Parents

Below: A family follows the PEEP Family Science app suggestion to experiment with shadows outside. Right: The app also provides step-by-step instructions to make shadow puppets. All images courtesy WGBH Boston



reported using science-process skills, which included making observations and comparisons, asking questions, testing and experimenting, and communicating and sharing ideas. Almost all parents were observed using the parent-child engagement strategies, and a number of them commented on how using the PEEP apps provided them with valuable one-on-one time, a way to bond and have fun together while helping prepare their child for kindergarten and beyond.

For more about PEEP Family Science or to download the apps, visit [peepandthebigwideworld.com/en/educators/peep-family-science](http://peepandthebigwideworld.com/en/educators/peep-family-science).

**Borgna Brunner** ([borgna\\_brunner@wgbh.org](mailto:borgna_brunner@wgbh.org)) is an editorial project director in the education department at WGBH Boston.

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