

## 3-D advances come with health concerns for children

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In a seeming blink of an eye, 3-D technology has advanced beyond imagination. Hollywood, TV manufacturers and video game makers say you have to see it to believe it. But the visual trickery that produces 3-D images can also lead to headaches, motion sickness and possibly impaired vision.

Game maker Nintendo acknowledged the concerns at the end of 2010, when it issued an unusual caution even before its long-awaited 3DS handheld [game machine](#) arrives in U.S. stores as soon as March.

Nintendo says children 6 years old and younger should not use the device because of the risk of lasting damage to ocular development.

No one really knows what the risk is, however, because there's scant research on how the latest wave of 3-D technology affects young eyes.

Nintendo touts its 3DS system as revolutionary: No dorky glasses required.

The breakthrough is made possible by tiny prisms embedded in high-resolution screens that scatter [digital images](#) into stereo visual 3-D.

Gamers can't wait to get their hands on the new portable console, and analysts predict brisk sales.

"It's going to be pretty impressive technology if it works the way they

say it will," said Justin Chapman, a manager at the GameStop store near Sacramento's Pocket neighborhood.

Dozens of gaming enthusiasts have sought to preorder the device through Chapman's store, but an official release date has yet to be announced.

Certainly, 3-D technology has come a long way since the days of cardboard glasses. New digital equipment and animation techniques, coupled with improved science about how our eyes and brain process images, have brought cutting-edge sophistication.

The concept, though, hasn't changed: Two streams of images are superimposed atop one another, with each eye acting as a receptor for the other. The brain recombines the stereo visuals into 3-D life that bends the rules of perception.

The sensory manipulation causes some eyes to strain in confusion.

Our eyes usually converge when we look at nearby objects and diverge when we look into the distance. With 3-D images, there's a visual conflict. Our eyes are conditioned to focus on what's happening on a flat plane, while our minds are tricked into seeing simultaneous images up close and farther away.

The more extreme the stereo 3-D effects, the greater the perceptual conflict, said Martin Banks, a vision scientist at the University of California-Berkeley.

"There's been a rush to get the technology out there," he said, "and these companies are doing so because they're trying to make a buck. That's our capitalist society."

Various industries are racing to refine the emerging technology for a

host of digital platforms - from electronic tablets to smart phones.

New 3-D television sets have already hit the market, but have had a lukewarm reception by consumers, partly because there is still little content to view and their cost remains high.

In all, manufacturers sold about 3.2 million 3-D televisions in 2010, according to DisplaySearch, a Santa Clara, Calif., market analyst. It predicts that as many as 18 million 3-D sets could be shipped in 2011 and more than 91 million by 2014.

Glen Hamahashi, a Sacramento resident who calls himself "really techy," is impressed by some of the new TV sets, despite the cost.

But he's not quite ready to splurge on the Nintendo 3DS for his daughter Kayla, 10, who already has several earlier models.

Is Hamahashi concerned about the device harming his daughter's eyes?

"Not really," he said. "I can always switch off the 3-D."

While the 3-D industry has kept an open ear to scientists, who say care needs to be exercised in producing content that will be easier on the eyes, studies on the long-term impact of 3-D viewing, particularly among the youngest children, are only beginning.

"It remains a big question mark," Banks said. "The truthful answer is that we know very little because the data is not there." In the research that does exist, "there's no red flag that tells you it's something to be worried about."

Still, Nintendo's cautious approach could make sense - to protect the company against potential lawsuits, Banks said, particularly if studies

later prove lasting damage to young eyes.

VSP, the Rancho Cordova, Calif.-based vision care insurer, urges children to take frequent breaks, using the 20/20/20 rule: Every 20 minutes, look 20 feet away for at least 20 seconds.

VSP urges parents to heed warnings - red eyes, eye rubbing, squinting or skipping lines when reading - to screen for potential symptoms of 3-D overexposure. If trouble is suspected, an eye exam could be warranted.

Doctors say the bigger danger remains children sitting too close to TV screens - regardless of whether the images are 3-D.

Dr. April Omoto, an optometrist in Sacramento, urged parents to impose moderation. "I have parents who tell me their children spend up to six hours straight" playing video games.

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