Why you should talk to preschoolers about particle physics

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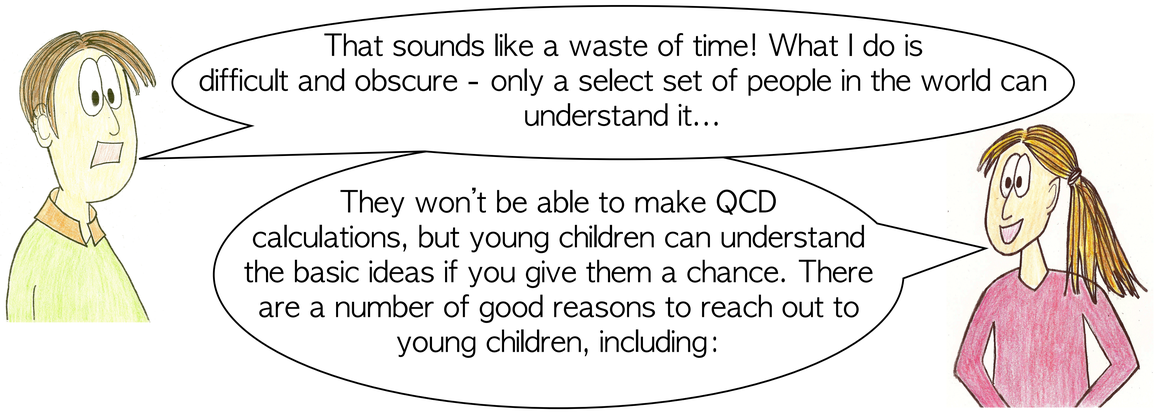
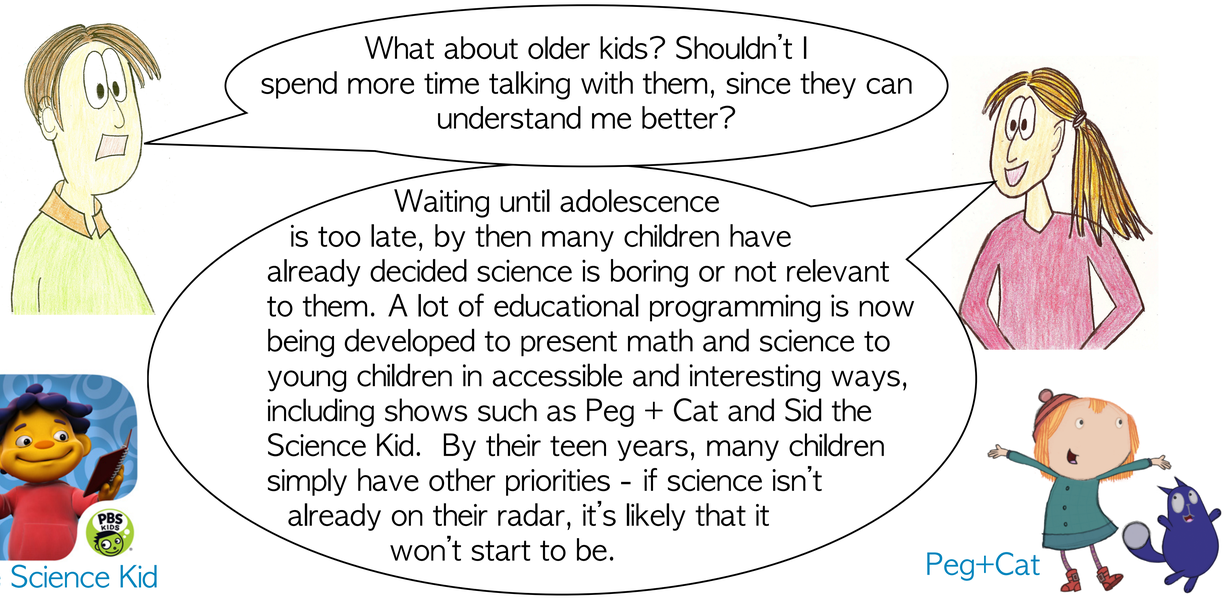


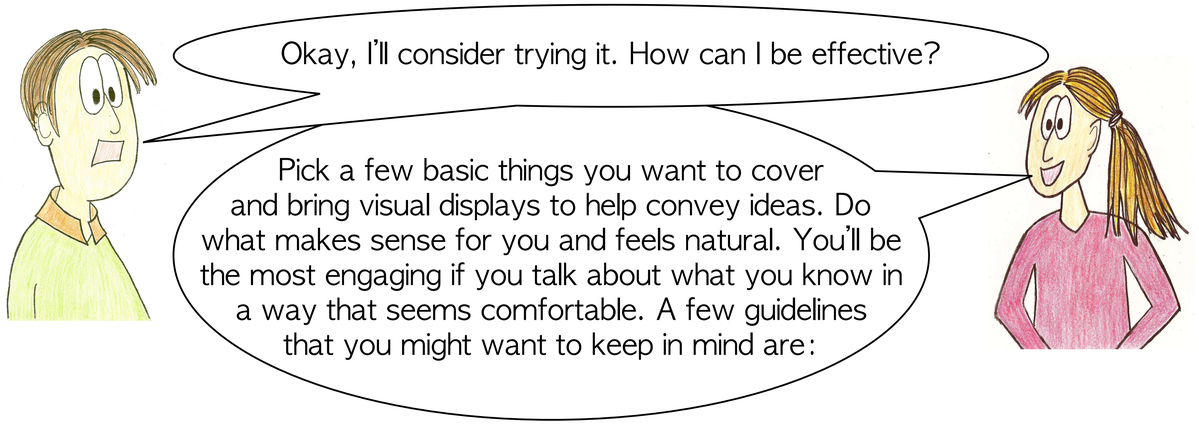
1. Preschoolers love to discover the world around them! Most young children genuinely want to learn everything they can about the things around them and they can remember a surprising amount of what you tell them! Reaching out to them at a point in their lives when they are naturally curious can spur an interest in the "hard" sciences, like physics, that they might not otherwise develop.

2. Science literacy is like any other kind of literacy. Building literacy in anything (e.g. reading, math) is a gradual process that requires continual exposure!!! You can't read after someone shows you a book for the first time, the same is true for physics. The more children are exposed to science, the more comfortable they will become with it.

3. You are the only one that can provide exposure to particle physics. Grown-ups want to help and encourage children's interest in STEAM areas, but often don't know much about science themselves. By teaching the children, you're also educating the teachers and parents about particle physics!

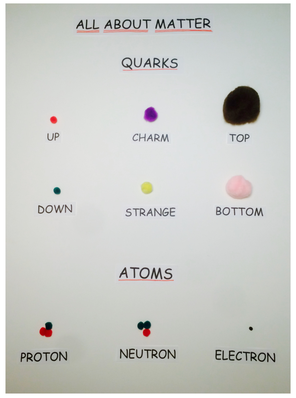
4. These are the next generation of taxpayers, voters, and scientists! You need to talk to children about physics when they are forming opinions about what is important in the world. If you don't tell them now, it probably won't be something they consider relevant later. Environmentalists and social rights campaigners have recognized this for years - their strongest messages are directed toward children, repeatedly, throughout their school years.





- ☑ Keep it simple! Simple doesn't mean "dumbed down", though. Respect for your audience is of paramount importance for an effective presentation. If you prioritize the most important topics you want to cover, you can introduce surprisingly sophisticated ideas. WARNING: Be careful not to slip into jargon! Also, make sure to leave your "I'm so smart, see all the things I know" attitude at the door - that can be intimidating for children (and grown-ups).

- ☑ Combine ideas with tactile displays. This doesn't have to be elaborate or time-consuming - pom poms glued onto poster board to represent quarks and atoms are inexpensive and kids love them! (Note: Hobby Lobby has a superior selection of pom poms.) For the materials to be the most effective, leave them behind for the teachers and children to look at later!



- ☑ Connect abstract ideas to the world around them. You can start with matter (What is the chair you're sitting on made of? Matter! What is that matter made up of? Protons and neutrons! What are the protons and neutrons made up of? Quarks!) then discuss its interactions (e.g., try teaching them that electrons pass through the wires in the wall to make electricity).

- ☑ Take some time to make it personal. Show them something that you really like working on or that you think is especially neat. Do you search for dark matter? Take some time to talk about it! Did you contribute to the search for the Higgs boson? Talk about what the Higgs does and how you felt when it was discovered!

- ☑ Have an activity to complement the topic. Remember to make it fun! Some possibilities include:
  - Let each child glue together pom poms to make a new particle, then glue everyone's particles on a board to make a particle zoo!
  - Do you like to sing? Try writing a quark song and have them sing along!
  - Have a contest to see who can draw the most amazing new particle.
  - Did you teach them how quarks interact with each other? Let the children make up a silly quark dance!

- ☑ Finally, go back and review the material you covered! Take time to answer their questions and ask them a few to see if they remember what you talked about. Don't be discouraged if they don't answer them, though, they might be tired or just don't want to talk right then.

Summary Talking to preschool age children doesn't have to be elaborate or expensive. It might take a bit of time to prepare (especially the first time you do it), but it doesn't take a lot of time, and it can be an incredibly rewarding experience for both you and the children. YOU are the only one that can teach them about particle physics in an informed and meaningful way. In doing so, you can support the scientific literacy of the next generation and positively impact the future of the field!