1327126

How easy is it to introduce a young child to the topic of genetics? A short reflective account.

It was a difficult task in deciding what to do for my Student Devised Assessment. The main inspiration for my SDA was found in a random father/son moment when we were discussing mutants from the fictional Marvel series 'X-Men'[1]. He began enquiring into how the characters had obtained their powers, so I had to devise a way to introduce the subject of genetics to my 7-year-old son and break down this complex topic to him, in a way that he could easily comprehend. This made me consider the 'epigenetic principle', an appellation used in explanations of a life forms development in utero. This principle asserts that that ''anything that grows has a ground plan, and out of this ground plan the parts arise, each part having its time of special ascendancy, until all parts have arisen to form a functioning whole'', as argued by Erikson[2]. So maybe I could be creating a future scientist, who knows. In this paper I will discuss, in a reflective way, how to introduce a young child (using my own, as the opportunity arose) to the topic of genetics.

[1] http://marvel.com/characters/71/x-men

[2] Erikson (1980: 53)

With an interest in science, very similar to myself, I began looking for child friendly video on YouTube[3] to help with ideas which would enable me to introduce the subject of genetics to 'the boy', as I fondly call him, in a simple way. He is a huge fan of the Marvel universe which, coincidentally, has a plethora of scientific themes and concepts. Spiderman is his favourite character by far and is always happy to share his knowledge of Spiderman, all day if you'll let him. For anyone unaware of the Marvel universe, the infamous 'Peter Parker' (also known as Spiderman)[4] is the story of a New York high school student who was bitten by an irradiated spider. The bite changed his biology and gave him super powers, which are based upon those of a spider, i.e. the ability to climb walls and lift items larger or heavier than himself[5]. The interdisciplinary module provided me with the tools to approach this from a beginner's level, which allowed me to then impart some basics of the subject to the boy, which in turn perhaps encourage his interest in science – he insists he is going to be a scientist, and a singer. This is something in his genes, as my mother told me I used to suggest similar things when I was his age. 'It's in the genes', as they say.

With the interest that my son has in the Marvel universe, which is filled with stories of genetically modified and, or, genetically mutated characters I found that this aspect helped me to be able to assist him in engaging with the subject and for him to develop a deeper understanding. The characters have been on the receiving end of specific scientific mishaps (gamma radiation, for example, in the case of The Incredible Hulk[6], accidents or experiments which have altered the way they should

[3] https://www.youtube.com/watch?v=H8ivNaio3dg
[4] http://marvel.com/universe/Spider-Man_(Peter_Parker)#axzz5Dh49dSok
[5] http://marvel.com/characters/54/spider-man
[6] http://marvel.com/universe/Hulk_(Bruce_Banner)#axzz5FWAuZXm1

be as a homogenous human being. They have transmogrified, if they were not already born with specific genetic defects and discovered powers or abilities which makes them visible as 'super-humans'.

The best possible examples of such extraordinary characters are arguably the X-Men, who are a group of individuals that are despised and feared due to them being different from other human beings[7]. They are different in the sense that they all have unique and different genetic defects, or mutations, that enable them to have varied abilities. Tapping into what he can relate to most helped me to find the best way to give him a child-friendly description of genetics. This random father-son moment stirred me to encourage my son to pursue his passion to be a scientist who makes, as he often tells me, "potions to make the poorly people better, but not turn them into Lizard-man though". 'Lizard Man' is a baddie from the Spiderman series. This, motivated me to write a short reflective piece, and I hope it can be used by other parents, and educators alike, as an idea to introduce children to the ever- evolving field of genetic science.

I began by looking at child friendly videos on popular websites, as I wanted a more interactive way for the boy to have an introductory insight into the subject. The first video was a clip[8] from the 1993 film Jurassic Park[9] which contains a scene with an animated short film that aims to explain what DNA is in a way that is easy for members of mainstream society to understand easier. Despite some scientific dubieties, as argued by Pham (31st July 2015) the film, it does give a basic intro into what

[7] http://marvel.com/characters/71/x-men
[8] http://www.criticalcommons.org/Members/ccManager/clips/jurassicparkdnainfoviz.mp4/view
[9] https://www.imdb.com/title/tt0107290/

DNA is and its purpose. Another video[10] found on you tube was used to help explain it in a child-friendly way. I felt that in using this experience, via my own interdisciplinary experience, the boy should be able to get a grasp on the topic and no doubt I would open a can of worms for myself with some of the more complex areas of the field.

In contemplating other ways to keep the topic as child centric as possible, I tried to break it down in the best possible way I could that would help him to digest the concept of what genetics is. I reflected on the interdisciplinary module and considered the simplest ways I could possibly approach this challenge that had been set before me. Not by an esteemed expert in the field like a professor or a Dr but by an adolescent, one that was waiting with burning inquisitiveness for answers to his questions. However, the only topics I feel that would be best to engage with my son were mostly to do with film, but nonetheless the Marvel subject was possibly the best way to approach the topic.

As the boy is a budding science buff, fascinated with the Marvel universe and its plethora of super-beings I began to search for Marvel based information in the genetics field and came across some interesting blogs that discussed mutations. I felt that genetic modification was a good topic to discuss, as he can relate to it better because of the nature of the Marvel universe and most of the characters have in some way been genetically altered or were born with defective genes that have given them abilities. Hill[11] fantasises over the possibility of science creating a Wolverine or other such characters from the X-Men. He argues that we, humans, are

[10] https://www.youtube.com/watch?v=8qFAcgy7Ufw
[11] Hill, K. (23 May 2014).

all mutants, not that we will discover a new feature to ourselves such as wings. However, when we are born and all through are lives our DNA mutates and this can mean nothing at all or it could mean something harmful. Or, as I explained to the boy, our DNA changes as we get older and can mean we live to a long age with no complications or we could find some difficulties the older we get that could cause us problems.

To conclude the introduction to the field of genetics I asked him to pick a Marvel film to watch. He, of course, picked Spiderman (2012)[12] and seemed to enjoy this more as he could identify more of the technical aspects of the film, in which we discussed throughout. He pointed out that the spider that bit peter, its venom changed peters DNA. I nodded at him proudly and we continued watching. The next day, I let him read a little piece I put together for him to help him to remember the discussions we had on his introductory journey and it goes as follows:

Think of genes as a recipe, the ingredients that make living things like you and me… even that tree. Inside of each living thing are extremely tiny things called cells, and inside of those cells are thousands and thousands of genes. "Like my blue jeans"? Not the jeans you wear, the genes inside of us decide the colour of your skin or your hair, your features, like the shape of your face or if you will have freckles and even if you are broad or thin – what makes you, you. This is what scientists have named, DNA. Think of it as plan or a design. And that plan/design has made you. Half of your DNA comes from daddy and half comes from mommy, this is why you have tiny ears like me and feet like mommy's. You also have grey eyes maybe that's a mutation, maybe you have superpowers. He looked at me sceptically but also contemplated for a while. Why don't we all look the same? You may wonder. Well…

[12] https://www.imdb.com/title/tt0948470/

Imagine, in your classroom, there are lots of other children. It is easier for the teacher to tell one child from another because every person has a different DNA that makes you all look different.

I showed my son an article of the "Vacanti Mouse"[13] for visual purposes. This, he described as being "the grossest thing ever"! But was transfixed on it all the same, then decided he wouldn't want one as a pet.

I can say that I enjoyed exploring aspects of this module, and although not an aspect of the sciences that I am accustomed to, that being the social sciences, it was interesting to see the varied topics available and also gather some scientific information based on a topic that appeared in another module, based on race. Overall, I feel the module was very well planned out and structured and gave me a good introduction the genetics field which, in turn, provided me with some key tools – particularly that of using film as a way of looking at new topics within the science field, that enabled me to share aspects with my son.

So, to answer the question, It can be easy to explain genetics to a child but I would say it would be easier to do so with the use of film and interactive tools that allows them to engage with the complex topic at hand.

[13] Hugo,K. (16/9/17) http://www.newsweek.com

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