

Hair Color

The first safe commercial haircolor was created in 1909 by French chemist Eugene Schuller, using the chemical paraphenylenediamine. Hair coloring is very popular today, with over 75% of women coloring their hair and a growing percentage of men following suit. How does haircolor work? It's the result of a series of chemical reactions between the molecules in hair, pigments, as well as peroxide and ammonia, if present.



What is Hair?

Hair is mainly keratin, the same protein found in skin and fingernails. The natural color of hair depends on the ratio and quantities of two other proteins, eumelanin and pheomelanin. Eumelanin is responsible for brown to black hair shades while pheomelanin is responsible for golden blond, ginger, and red colors. The absence of either type of melanin produces white/gray hair.

Natural Colorants

People have been coloring their hair for thousands of years using plants and minerals. Some of these natural agents contain pigments (e.g., henna, black walnut shells) and others contain natural bleaching agents or cause reactions that change the color of hair (e.g., vinegar). Natural pigments generally work by coating the hair shaft with color. Some natural colorants last through several shampoos, but they aren't necessarily safer or more gentle than modern formulations. It's difficult to get consistent results using natural colorants, plus some people are allergic to the ingredients.

Temporary Hair Color

Temporary or semi-permanent haircolors may deposit acidic dyes onto the outside of the hair shaft or may consist of small pigment molecules that can slip inside the hair shaft, using a small amount of peroxide or none at all. In some cases, a collection of several colorant molecules enter the hair to form a larger complex inside the hair shaft. Shampooing will eventually dislodge temporary hair color. These products don't contain ammonia, meaning the hair shaft isn't opened up during processing and the hair's natural color is retained once the product washes out.

How Lightening Works

Bleach is used to lighten hair. The bleach reacts with the melanin in hair, removing the color in an irreversible chemical reaction. The bleach oxidizes the melanin molecule. The melanin is still present, but the oxidized molecule is colorless. However, bleached hair tends to have a pale yellow tint. The yellow color is the natural color of keratin, the structural protein in hair. Also, bleach reacts more readily with the dark eumelanin pigment than with the pheomelanin, so some gold or red residual color may remain after lightening. Hydrogen peroxide is one of the most common lightening agents. The peroxide is used in an alkaline solution, which opens the hair shaft to allow the peroxide to react with the melanin. ☺

Permanent Hair Color

The outer layer of the hair shaft, its cuticle, must be opened before permanent color can be deposited into the hair. Once the cuticle is open, the dye reacts with the inner portion of the hair, the cortex, to deposit or remove the color. Most permanent hair colors use a two-step process (usually occurring simultaneously) which first removes the original color of the hair and then deposits a new color. It's essentially the same process as lightening, except a colorant is then bonded within the hair shaft. Ammonia is the alkaline chemical that opens the cuticle and allows the hair color to penetrate the cortex of the hair. It also acts as a catalyst when the permanent hair color comes together with the peroxide. Peroxide is used as the developer or oxidizing agent. The developer removes pre-existing color. Peroxide breaks chemical bonds in hair, releasing sulfur, which accounts for the characteristic odor of haircolor. As the melanin is decolorized, a new permanent color is bonded to the hair cortex. Various types of alcohols and conditioners may also be present in hair color. The conditioners close the cuticle after coloring to seal in and protect the new color.

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Topic of Science Quiz 你知道唔知道? in May

9th, 26/4-7/5: **DNA** 10th, 10/5-20/5: **Environmental Protection** 11th, 24/5-4/6: **Friction**
Questions are posted on the notice board of Science Promotion Team near the Staff Common Room. Students can find the five questions and get the answer sheets on our board. After filling in your answers, put it into the box provided. Students who can get all the answers correct will be awarded a small gift.

Lunch Time Video Shows: 12:20 p.m. @ Chem. Lab. (Room 512)

Date	Name of Program	Phy	Chem	Bio
4/5/2010 (Tue)	The Sun 從地球到宇宙：貼近太陽 (Part 2)			
7/5/2010 (Fri)	Investigation X-Siberian Apocalypse 超自然調查檔案-西伯利亞浩劫 (Part 1)			
11/5/2010 (Tue)	Investigation X-Siberian Apocalypse 超自然調查檔案-西伯利亞浩劫 (Part 2)			
14/5/2010 (Fri)	Naked Science - Pyramids 科學新發現-埃及金字塔(Part 1)			
18/5/2010 (Tue)	Naked Science - Pyramids 科學新發現-埃及金字塔(Part 2)			
25/5/2010 (Tue)	The Universe - Alien Planets 宇宙：日外行星 (Part 1)			

快訊-國際初中科學奧林匹克選拔賽

是項選拔賽，旨在識別有科學天賦的初中學生，參加進階科學知識培訓課程。期望學生可以透過培訓課程，促進學生的協作、批判性思維、創意與溝通技巧方面的發展。最後六名經過訓練的學生，將代表香港參加 2011 年 12 月初舉行的第八屆國際初中科學奧林匹克。國際初中科學奧林匹克通常為期十天。國際初中科學奧林匹克是一項讓 16 歲以下的中學生在自然科學方面比賽的年度活動。參賽第八屆國際初中科學奧林匹克的學生必須於 1996 年 1 月 1 日或以後出生。

選拔賽結果：本校霍情同學(2A)及鄧智健同學(2B)榮獲二等獎，

而何家華同學(2A)則獲得三等獎。

二等獎得獎同學將獲邀參加國際初中科學奧林匹克第一階段培訓。



Can Your Hair Turn White from Fright or Turn Gray Overnight?

You've heard tales of extreme fright or stress turning a person's hair suddenly gray or white overnight, but can it really happen? History records that the hair of some condemned prisoners [e.g., Thomas More (1535) and Marie Antoinette (1793)] turned white overnight before their executions. However, I am unaware of any modern reports of this happening. It's documented your apparent natural haircolor can change over the course of several weeks/months from conditions that affect your hormones (such as pregnancy) or from taking certain medications (like chemotherapy), but can you go gray overnight? Let's look at the chemistry of hair to answer the question.



Hair is a protein that gets its natural color from the presence of a pigment called melanin. Anyone who has bleached their hair can tell you it's chemically possible to render the melanin colorless. Therefore if your sudden fright has something to do with exposure to ionizing radiation or bleach, I can see white hair being a possible outcome, though less likely than baldness or death. Seriously, unless you are playing with toxic radiation or chemicals, you can't instantly change your hair color.

Can fear or stress or any extraordinary emotion change the color of your hair? Yes, but not instantly. Your psychological state has a significant impact on the hormones that can effect the amount of melanin deposited in each strand of hair, but the effect of emotion takes a long time to see. The hair you see on your head emerged from its follicle a long time ago. So, graying or any other color change is a gradual process, occurring over the course of several weeks, months, or years.

Your emotions can't instantly change the color of your hair, but it is possible you could turn gray overnight. How? A medical condition termed "diffuse alopecia areata" can result in sudden hair loss. The biochemistry of alopecia isn't well understood, but in people who have a mix of dark and gray or white hair, the uncolored hair is less likely to fall out. The result? A person can appear to go gray overnight. Although I didn't find any references on this, the implication to me is your hair thins or you become bald if you don't have any gray hair, which for some reason is less resistant to the effect. Sudden hair loss can be caused by certain drugs, medical conditions, or by sudden stress. It tends to occur over the course of several days/weeks, but the result is still dramatic. ☺

Why Does the Pool Turn Blonde Hair Green?



It isn't the chlorine that turns blonde hair green. Oxidized metals in the water bind to the protein in the hair shaft and deposit their color. The metal that produces the green tint is copper, which is most commonly found in algicides, though it naturally occurs in some water. The bleach that is added to a pool may be responsible for oxidizing the metal, but it's not the cause of the color.

If your hair turns green, you can remove the discoloration by using a shampoo that chelates the metal. To some extent, you can prevent copper from binding to the hair by sealing the hair cuticle with a conditioner before swimming. Rinsing your hair immediately after leaving the pool will help protect it, too. ☺

新一代文化協會科學創意中心科普講座

名稱：創新機械人設計及創意思維 日期：8-5-2010 (Sat) 時間：9:30-11:00 am

簡介：劉文建博士於香港大學計算機科學系(Computer Science)畢業後曾於微軟美國總部參予開發中文視窗，之後以住家辦公室創業，並開發了九方中文輸入系統，七年後其公司在香港聯交所上市，繼續多項發明，再於香港大學研究進修博士以及教授遊戲課程。

內容：大家可曾想過自己製作一個機械人去輔助自己、提高自己的生活質素？透過教授機械人知識，此講座不但可加強新一代對編寫電腦程式的了解，引發他們對科技的興趣，還可讓他們發揮創意，設計自己心目中獨一無二的機械人。

名稱：向星空出發 日期：29-5-2010 (Sat) 時間：9:30-11:00 am

簡介：鄭家明先生任教於基督教宣道會宣基小學，於2008年的第八屆中國青少年機器人競賽中勇奪10優教師的榮譽稱號。作為香港科學創意學會的理事之一，一直積極參與學會活動，對推廣科學創意不遺餘力。

內容：四季星空交換更替，襯托出奇妙的天宇星繁。浩瀚蒼穹，原來也可透過我們的雙眼一窺其奧秘。本講座將介紹四季星空的不同星座，春天獅子、夏季天蠍、秋至天后、冬來獵戶將在講座中展現；同時，講者亦會分享簡單實用的肉眼觀星方法，讓我們身處大城市也能體會仰觀夜空的無窮樂趣。

費用全免，有專車接送往返九龍塘地鐵站。有興趣同學請到化學實驗室門外壁報板上簽名，先到先得。

太空館專題講座

30-5-2010 (Sun)	3:00-4:30pm	太空·天氣預報	香港太空館演講廳	岑宇軒先生及蔣善恆先生 (星匯點委員)
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天氣和很多人息息相關。陰晴圓缺、潮汐漲退和各種各樣的天氣，都影響著我們的日常生活。隨著科技的進步，我們關心的已不止於地球的天氣，還有太空中的「天氣」。這個「天氣」所指的是影響著地球的太空狀況，當中包括和我們息息相關的各種太陽活動，其影響力實不容少覷。究竟太空「天氣」怎樣影響著我們？太陽活動又會對我們造成甚麼影響？而我們又有甚麼方法去預測呢？這次講座會嘗試找出答案。費用全免，先到先得。

醫學公開講座

8-5-2010 (Sat)	10:00-12:00am	治癌新知：由中醫藥到網上資訊	香港銅鑼灣中央圖書館演講廳	朱藹美博士(港大中醫藥學院助理教授)及梁綺雯博士(港大護理學院助理教授)
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費用全免，同學可登入 <http://www.hku.hk/facmed/publiclecture2010> 進行網上登記留座。

香港科學館專題展覽

香港科學館將於三月至八月期間展出兩個專題展覽。詳情如下：

1. 《神州生態 - 中國野生動植物標本展》(至 31-8-2010)

邀請你一同探索中國豐富的野生動植物資源，希望能喚起大家對自然生態的關注，以及認識生物多樣性和生物之間互存相依的關係。

2. 《轉基因魚快速檢測雌激素類污染》(至 11-7-2010)

越來越多的化學物，甚至那些過去被認為很「安全」的化學物，由於會擾亂內分泌系統，現在已被歸類為「內分泌干擾素」。內分泌干擾素(尤其是雌激素類內分泌干擾素)的污染問題，正威脅著各種生物和人類的健康，成為了全球最嚴重的環境問題之一。發展一個既可靠又能準確快速檢測雌激素類內分泌干擾素的方法實為刻不容緩。由香港城市大學生物及化學系鄭淑嫻副教授領導的研究小組，最近就培育出一種轉基因耐鹽鯖鱒魚。該魚能敏銳地偵測出雌激素類內分泌干擾素的存在，並通過發出不同強度的綠色螢光來反映雌激素的活性水平。除了敏感度高及操作容易外，這方法亦兼具快速及低成本這些優點。

優惠票：\$17.5 (適用於全日制學生) 星期三免費入場之安排及博物館週票不適用於此展覽