Heliotrope to create some great things to

Heliotrope Sun-Tracking SystemAvijit Mandhata – 501704118Introduction: Biomimeticsor Biomimicry is the imitation of the models, systems, and elements of naturefor the purpose of solving complex human problems. Nature has been the onlything that is into existence since the beginning. There are many livingorganisms and plants that have slowly adapted to the environment they arestaying in and slowly have become what we can also call as the miracles made bynature. Their impeccable adapting skills and body have allowed them to survivethrough all the harsh environment negativities and stay alive without being aprey or has always even helped them to find the right amount of resources fortheir survival. Out of all the beings on this planet luckily humans are one ofthe most advanced creatures in terms of their adaptability and in terms ofusing their brains to create some great things to make their life simpler andsolve the common and dangerous problems. With all the technologicaladvancements made by humans, they have been a lot dependent on nature for thetechnologies.

Nature, being the most experienced out of all has literally givenhumans a lot of lessons in terms of the technological advancements which humansactually follow and make these technologies much more effective and efficient. Examples of biomimetics can be the bullet train whosemodel is based on the kingfisher bird or even the velcro which is based on theprinciple as to how the burr sticks to dog’s hair and clamps itself there. Eventhe self-cleaning lotus leafs, efficient ventilation of termite nests, materials based hydrophobic nature of plants. Biomimetics materials are man made materials which actuallymimic the properties of a natural plant or animal or even a part of their body, like some organ or even a tissue. As the human civilization has

grown andadvanced, so have their materials and research skills advanced which helped inthe introduction of synthetic materials in the current age. With their improvedability in the field of material science and deep research they are actuallyable to mimic some of the great qualities present in nature in some of thebeings. Let it be land, water or air, Biomimetics has helped replicate thetechnologies and adapt to the environment in a much effective way. It can helpin creating a flexible, high strength, low corrosion, low reactive, ductile, elastic material which can have numerous uses in various industries.

The above-mentionedproperties are only a handful, but if we tap into the potential of biomimeticswe can have various materials with various different properties befitting theuse/role of that particular material. Class Experience andSummary: Material Science for Managers is a newly introduced course inour curriculum and not just in our curriculum but it is quite rare to find sucha subject being taught in a management institute. With a descent knowledge inmaterial science based on my background as an Automobile Engineer, this coursehas helped me understand various other factors and some very new andinteresting technologies with the help of Biomimetics. It has been quite aninteresting session learning about its applications and looking at real lifeexamples as to how it has been adopted by the environment and is being used forthe technological advancements. Using nature’s great adaptive skills andmimicking them to solve real life problems have been a great deal. Biomimeticsis taking motivation from the nature to make more sustainable and uniquematerials. We have actually learned how

with the help of biomimicry we canproduce new materials and improve the already existing ones to be moreeffective and efficient.

The future technology should be sustainable in natureand biomimetics help us understand how we can use natural resources/organismsor even the other beings to help become more sustainable. Biomimicry ofHeliotropic Plants: As we all know that planet Earth is avery dynamic planet and it has both very beautiful and very harsh environmentconditions in many different parts. But humans have this great ability to adaptto any kind of environment. Plants and animals in those regions adapt very welland their body is also desined in a way to make the maximum utilization ofresources at the lowest possible effort. So when it comes to harsh environmentswherein there is minimum sunlight plants become Heliotropic in nature. In thiscase the plants bear flowers which always turn their face towards the sun toget maximum sunlight. This is their one chance to capture solar energy andconvert it into sugars they need for energy.

They do this by maximizing theirexposure to sunlight by a process calledheliotropism. This technology is actually been worked upon to be used in caseof the solar panels. Solar Panels are generally fixed at a particular angle toget maximum sunlight but if it is movable it can capture more sunlight and bemore efficient. But for its motions, it needs to be installed with motors andelectronic control systems but that may again add to the cost of it. In this case a technology was developed wherein they used thedifference in temperature between shaded and sunny areas to change theproperties of the material supporting the solar photovoltaic cells.

The solarpanels are mounted at the top of a curved arch made up of two kinds of metal, such as aluminum and steel. The apparatus is expected to be durable enough to withstandthe elements with little or no maintenance. Solar Panels that track the angleof sun can be actually 38% more efficient when compared to the fixed SolarPanels at generating power. Similar kind of technology was also used with thename of a sunflower project where they mimicked the phototropic qualities in asunflower and created a device that once mounted with a photovoltaic panel, would follow the sun increasing the panel’s electrical output without consumingany electricity in the process.

The “ flowers” on the sides of thedevice direct sunlight to a central container. In the container, pressurebuilds causing a piston on the opposite side of the device to tilt it towardsthe sun eventually capturing maximum sunlight and generating more power. Beloware some of the images showing the heliotropic sun tracking effect. Conclusion: The above topic can be concluded looking at the fact as tohow this technology of heliotropism can actually help us. It can have variousapplications in terms of effective use of solar panels.

It can also be used inthe satellites that go into the deep space as it would help their panels togain maximum amount of sunlight and be much more efficient. It can also be usedin individual houses decreasing the cost of fixed solar panels as then lessnumber of panels can be used. Biomimetics has eventually helped mankind developin many sectors adapting from the nature eventually decreasing the cost andincreasing the efficiency.

And about the relevalnce of this course of Material Sciencefor Managers in our MBA curriculum, as per my view it will always help us inmaking better decisions in the future. Let it be the adapting skills or anycompany where we can actually use this technology, it will always give us acutting edge over others having some knowledge in various fields particularyinto a field which is actually being used everywhere.