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ENGLISH 206
FINAL EXAM
FALL 2003-2004

Name:_____ **Instructor:** _____

PASSAGE A:

Green Piece: Get on Board with Sustainable Products to Make Your Facility "Green"

Every industry advances through new technology and more highly developed products. Essentially, "green" products are just that: A more advanced generation of products and technologies based on where society stands today. Green products are essential to a sustainable society, because obviously Earth does not have infinite space or resources. Green products fulfill a need for durable, cost-effective, functional products of all types, especially in real estate, but they do so with much greater elegance and efficiency than previous generations of products.

What is a Green Product?
Products made from environmentally benign materials are labeled green. Also, products made from or with salvaged or reused products, post-consumer or post-industrial recycled content, certified wood, agricultural waste (i.e. strawboard*), renewable agricultural products or natural or minimally processed products are deemed green.

When seeking green products, look for items that do not involve ozone-depleting substances, conventional preservative-treated wood or other toxins. Products that reduce environmental impacts during construction, renovation, demolition or building operation are also desirable for green-minded owners and managers. Other examples of desirable features of green products include: reducing heating and cooling loads, conserving energy and water, using renewable energy and fuel cell equipment, maintaining exceptional durability or low-maintenance requirements, preventing pollution and reducing waste or pesticide use.

Everyday Applications

Take the example of "cool" roofs. Simply using a white rather than a dark roof reflects the sun's heat, reducing heat gain and air conditioning requirements. Integrate a solar electric system into the roof and you don't need a roof at all.

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* strawboard: a coarse yellow cardboard made of straw pulp.

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Carpeting is an interior example of green product advances. According to Carper and Rug Institute (CRI) president Werner Braun, 85 percent of post-industrial waste is reused in the manufacturing process. Despite a 40 percent production increase, greenhouse gas emissions have been capped at 1990 levels and 46 percent less water is used now than in 1990. Many of the leading carpet manufacturers including Milliken, Collins & Aikman and Shaw offer owners the opportunity to replace worn out carpet tiles rather than an entire carpet. Shaw's Green with Envy product line features recycled yarn and backing.

Today, managers make product decisions based on factors such as durability, quality, price and a supplier's reputation. Product attributes deemed green add-ons today will be part and parcel of what is considered a quality product tomorrow. Higher quality products will be more energy efficient, and use fewer virgin materials and resources to produce. Products will easily be reused or recycled at the end of their useful life.

These common sense advances will permeate the industry during the next 20 years. Until then, however, ask the right questions and work with the right suppliers to create and maintain an efficient, non-toxic building environment inside and out.

[Adapted from Fried, R. (2003, July-August). Greenpiece: Get on board with sustainable products to make your facility "green". Journal of Property Management, 68 (4), 25 (3)]

PASSAGE B:

Green Light

Schools and universities are building and operating their facilities more efficiently as they continually look for ways to reduce energy use. One of the easiest and most effective components of energy management is lighting control. Many schools can install lighting controls that significantly reduce unnecessary lighting usage.

At the root of the drive for energy efficiency is the concept of sustainability, or "green" building. This involves using environmentally benign building materials whenever possible, as well as renewable resources and energy-efficient technologies to operate and maintain facilities. The move to green has been propelled by a desire to save energy, especially as those costs continue to escalate. Embracing green design principles also can help schools attract students, particularly at higher-education institutions. A growing number of national and state programs can assist schools in establishing green practices.

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Lighting-control technologies

Lighting controls can encompass dozens of different types of products, but basically there are three underlying technologies that provide automated control of building and exterior lighting. Occupancy-sensing technology works by detecting the presence or absence of occupants in a space and switching the lighting on or off as appropriate. Daylighting technology uses a photosensor to identify the level of natural light contribution; when this reaches a prescribed level, the control will adjust artificial lighting downward or off. Finally, scheduling-based technologies control lighting through programmed schedules. At specified times or when particular events occur, the control apparatus, usually a control panel, turns lighting on or off as desired.

No school is identical, but most have comparable spaces and lighting needs. For these spaces, lighting-control professionals can identify specific control strategies that will provide appropriate lighting and minimize unnecessary lighting.

Common spaces

For many classrooms, a combination of occupancy sensing and bi-level switching offers effective control and convenience. An occupancy sensor will turn lighting on when someone enters a classroom and turn it off when the room is vacated. Wall switches can override the sensor for specific situations, such as showing a film. Switches also enable bi-level control, in which an individual lamp in each fixture can be turned off to minimize energy usage without significantly affecting lighting levels. With this type of classroom application, typical savings can range from 30 to 40 percent.

School restrooms also benefit from occupancy-based control. In large school restrooms, the best practice includes installing a ceiling-mounted ultrasonic occupancy sensor. It can detect occupancy around partitions and other obstacles. An occupancy sensor also can control lighting and exhaust fan operation at the same time. The resulting savings can be as high as 40 percent.

Daylighting is an effective strategy for those areas with substantial natural light. This typically includes classrooms on building perimeters and administrative areas. In these rooms, a daylighting control can be added to basic occupancy-based control and bi-level switching. A photosensor will dim controlled lights when the daylight contribution reaches a specified level. When daylight diminishes, the sensor returns lighting to higher levels. This added level of control can increase energy savings by 10 to 30 percent.

In administrative areas, such as a large private office with abundant daylight, an effective control strategy combines the use of occupancy sensors and daylighting control.

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Daylighting control also can enhance exterior lighting on a campus. For parking-lot and walkway lighting, an exterior photosensor will turn lighting on at dusk. A control panel can turn some lighting off at a specified time (perhaps 10 p.m., after scheduled activities have concluded for the day), while maintaining other lighting for security. Building-mounted security lighting around entries can turn on at dusk via a photosensor and remain on all night.

The best practice for other areas, such as hallways and gymnasiums, involves time-scheduled control. In hallways, lighting would turn on at a scheduled time in the morning and remain on throughout the school day. After school hours, scheduled control would be supplemented with occupancy-based control, so some of the hallway lighting could turn off when the area is vacant.

In many gymnasiums, an effective control strategy involves scheduling lighting to turn on at a specified time in the morning. Lighting would remain on until a specified time in the afternoon, when regularly scheduled activities have concluded. At that time, lighting turns off via the control panel. For later events, school workers can override the control panel and turn on lighting with keyed wall switches or electronic timer switches. After a specific amount of time, the panel can automatically turn lighting off.

Regardless of how a school is designed or operated, the first step toward "greening" the campus remains the same—making a commitment to reduce energy usage and to learn about the resources available for reaching this goal.

[Adapted from Maniccia, D. (2003, August 1). Green light. American School and University, 72 (12), N.A.]

PASSAGE C:

It's in the Green

Federal, state and local initiatives are promoting sustainable building design and construction as a means to preserve natural resources and enhance building performance.

Sustainable building design benefits the bottom line in three key areas. Economic benefits include reduced life-cycle and operating costs. Environmental pluses include increased energy and water efficiency, reduced pollution and reduced landfill waste. Society benefits through decreased impact on the environment and increased comfort, health and quality of life for building users.

An integrated approach

To develop a sustainable facility successfully, a school must bring together the right stakeholders: school administrators, architects, engineers, constructors, building

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users and facility operators. They help establish clear goals for the building program, budget, schedule, aesthetics, environmental impact, and operations and maintenance at the conceptual design phase.

An integrated design phase approach provides greater opportunities for constructability reviews and "true" value engineering to improve the budget and schedule. It also affords members of the project team earlier opportunities to identify and seek financial incentives that may reduce capital costs or operating expenses.

Early participation of key members of the project team is important for any building project, but it is essential for a sustainable facility. Designing a sustainable building is more rigorous and time-intensive than a typical design. Yet, over the life of a building, this investment will generate higher performance at reduced operating costs.

A rigorous commissioning/quality-control process is another key element of an integrated design approach. Commissioning ensures that what has been designed and constructed meets the criteria of both the school and the architect. The process includes testing equipment and systems, and, if necessary, design reviews by a third party.

Objective ratings

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System is an excellent tool to focus the design process. Developed by the U.S. Green Building Council (USGBC), the LEED system is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings.

The rating system awards a total of 69 points in five categories:

- Sustainable Site Development (including strategies to address development, open space, parking, and access to public transportation)
- Water Efficiency (including the effects of landscape irrigation and use of potable water for sewage conveyance)
- Energy Efficiency and Atmosphere Emissions (including system efficiency and renewable energy)
- Materials and Resources for Construction (including building renovation and use of local, recycled and salvaged materials)
- Indoor Environmental Quality (including volatile organic compound emissions, and indoor air quality)

[Adapted from Bolin, R. (2003, September 1). It's in the green. American School and University, 76 (1), N.A.]

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English 206
Final Exam
Fall 2003-2004

Name:_____ **Section:**_____

Instructor:_____ **Time Allowed: 2 $^{1/2}$ Hours**

You are the CEO (chief executive officer) for sustainable design at Gale Co., a consulting, engineering and technology firm. Your firm designs high-performance buildings that meet LEED (Leadership in Energy and Environmental Design) standards.

You have read on the AUB website an RFP (request for proposal) issued by the Physical Plant of AUB. The Physical Plant is looking for a qualified company to renovate Nicely Hall; interested companies are asked to submit bids/proposals to the Director of the Physical Plant, Mr. Harrison.

Use the relevant ideas in passages A, B, and C to write a proposal on behalf of your company, promoting the idea of sustainable building design and focusing on its benefits on different levels. Use your discretion to supplement this information with needed details from your general knowledge.

1. Before preparing the proposal in which you promote the idea of sustainable building design for Nicely Hall, you need certain information on the current condition of Nicely Hall and the kind of design, materials, etc. that were used to build it or that were used during its last renovation. Write a letter of request to Mr. Harrison asking for needed information. Draw on the content of the passages and on your general knowledge to decide on the specific information that you should request. Mr. Harrison's address is Physical Plant, American University of Beirut, P.O. Box 11-0236, Riad El Solh Beirut 1107 2020, Lebanon. Your address is Gale Co., P.O.Box 123, Beirut, Lebanon.

1.1. Write your letter on page 2. (Use the back of the passage sheets for drafting if needed.)
1.2. Use the full block style when writing your letter.
1.3. Enclose some of your company publications to acquaint your addressee with your company projects. **(40 pts.)**

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2. Before writing the report, analyze the situation by answering the following questions briefly. (10 pts.)

2.1. How does writing your proposal in response to an RFP affect the content and structure of this document? (3 pts.)

2.2. Identify two possible secondary readers for your proposal. How do these readers affect your document? (3 pts.)

2.3. Suppose that when you look at the RFP and as you prepare the data for your proposal, you find that the best interest of a group of stakeholders (see passage C) conflicts with the interest of another group of stakeholders or with the interest of your primary audience. Anticipate and specify a possible issue that may create such conflict and say whether you believe you should address it in your proposal? Why or why not? If you decide to address this, how and where in your proposal? (4 pts.)

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2.4. **Write your report. (50 pts.)**
2.4.1. Use the memo format and address it to Mr. Harrison, Director of the Physical Plant.
2.4.2. Write your report on pages 5 and on. (Use this page for drafting if needed. You will **not** be given extra sheets of paper for drafts.)