Welcome

Thank you for choosing IBE for your educational needs. Current environmental realities demand a new approach to ensuring that our homes, schools and office buildings support the health and wellness of all who dwell there. We strive to provide the latest information and cutting edge methodology on the vital, complex relationship between the natural and the built environments. May you find your educational experiences enlightening, and take this knowledge out into your community for the benefit of all.

Michael Conn, Executive Director, Institute for Bau-Biologie & Ecology.

This course is intended to provide you with an general overview of indoor climate issues. For a more comprehensive understanding, we encourage you to peruse our wealth of online course at CLICK HERE, which are each available for download and/or online study for a low, one-time fee.

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What is Indoor Climate?

Let us begin our study with a chart which shows how a properly built house will be in harmony with both its inhabitants and with nature.

The Four Elements

Notice the four circuits labeled Air Circulation, Water Circulation, Matter Circulation, and Energy Circulation. These four major elements, while being closed circuits, also interrelate with each other and with the house. To understand how the chart works, consider the following very simple and brief descriptions:

- **Air**: Humans and animals remove oxygen from the air by breathing. Plants use the carbon dioxide they give off to make more oxygen.
- **Water**: Through the cycle of evaporation, cloud formation, rain, and then a return to groundwater or some body of water, water itself is purified and energized.
- **Matter**: Organic forms (plants and animals) ingest inorganic matter (minerals from the earth). When the organic forms die, inorganic matter is returned to the earth.
- **Energy**: The sun’s energy is stored by nature in wood, in plants, in oil and natural gas or converted directly into another energy form. When burned, the energy is released. Some forms of energy are renewable, such as wood and solar energy, and some are being used up, such as oil and natural gas.

These simplified and incomplete examples, when applied to the house, expand our knowledge of the interactions of air, water, matter, and energy. The interaction of these four factors with each other, with building materials, and with humans is a complex, perfectly balanced cyclic process where gasses, heat, moisture, and electrical charges are constantly changing and transferring energy. The end result is regulation of the overall Indoor Climate. Moisture is absorbed and released, different electrical charges are attracted to different places, heat flows from hotter to cooler areas, and air...
circulates in and out of people, animals, plants, and materials, giving and restoring life.

Before modern times, houses or shelters were built from natural materials and with natural processes. These shelters did not hinder the natural cycles described above but rather were part of them. Mud, adobe, straw, clay, reeds, leaves, wood, stone, animal skin or fur were on hand, depending on the locale, and were turned into shelters by the inhabitants-to-be. These shelters allowed air to circulate in and out, refreshing the atmosphere.

Today, with the onset of the Industrial Age, the increased desire for comfort, and consumerism, this has changed. Although more comfortable modern houses could have been designed and built to be as healthy as the earlier dwellings, this did not happen. Instead, technology went in the direction of synthetic and other troublesome building materials. These products caused problems for humans, both because the houses were made so tight that good air circulation could not be achieved and also, many of the products released harmful chemicals into the air (called out-gassing). In addition, moisture was often trapped in the tight houses, fostering the growth of molds, mildews, and bacteria. And so on. Instead of a chart showing healthy interactions of air, water, matter, and energy, the chart becomes unbalanced, as our houses have become unbalanced. They become productive of disease rather than health.

Further, technology's new products started to harm the atmosphere, the air and water quality, the climate and the ozone layer. New forms of energy brought benefits but also growing concerns about their effects on human and planetary health. We read that it will be 20,000 years or more before the ground around Chernobyl can be safely farmed again.

LESSON 2:

**Air Element**

Air is the breath of life. We can survive weeks without nourishment and days without water, but, deprived of air or exposed to lethal toxins in the air, life can end in minutes or even seconds.

The air we breathe consists of 78% nitrogen, 21% oxygen, and small amounts of trace gasses. In nature, there is a marvelous balance created by plants and animals. Plants provide oxygen for us to breathe, and we give off carbon dioxide to sustain the plants. Without the plants, carbon dioxide would build up, oxygen would be depleted, and we would die.

Air is fundamental to all aspects of climate: its presence is necessary for carrying moisture, electrical charges, and some forms of heat. The interconnectedness means that air quality is also dependent on its temperature, moisture content and electrical charge.

Right up to the middle of this century, buildings were primarily made with essentially natural, climate-regulating materials used in accordance with proven construction methods. These materials include timber, earth, brick, stone, lime, cork, straw and reed. In the last fifty years, however, circumstances have almost totally changed. Eighty to ninety percent of building materials, such as concrete, steel, plastic, and glass, are impervious to climatic regulation.

In fact, these manufactured building materials can negatively affect the air we breathe, when we are inside these structures. There is no longer a breathing wall of natural materials regulating room climate. Pollutants are trapped within the building, and their toxic off gassing becomes part of the air we breathe. Excessive moisture is trapped, leading to rot and mold growth. Mold spores (how molds reproduce) are released into the air, inhaled, and cause respiratory distress.
We need to understand how the building materials which surround us affect the air we breathe to develop a basic understanding of their nature as we develop a holistic, Bau-biological overview of our living environment.

**Major Indoor Climate Air Pollutants**

Some of the common contaminants or problems found in the air of indoor environments are as follows. Please be aware that this list is not all-inclusive.

- Outdoor Air
- Lead
- Bioaerosols (mold, mildew, bacteria, dust mites, animal dander, pollen)
- Volatile Organic Compounds (VOCs)
- Moisture control
- Pesticides
- Polyvinyl Chloride (PVC)
- Radon
- Dust and Particulates
- Asbestos
- Combustion Gases

**Lesson 3:**

**What can I do?**

It is no secret anymore that buildings – especially modern housing – can and do make people sick. This phenomenon has been studied for at least 20 years. The list of potential indoor pollutants and effects of low-level electromagnetic radiation is growing longer each year. The symptoms caused by “sick homes” are classified as Sick Building Syndrome (SBS), Building Related Illness (BRI) and Environmental Illness (EI). What is causing an indoor air problem? First of all it is the quality of the outside air. If you live in a big city or near an industrial area, your starting point is much worse compared to living in a rural setting, or even better near a beach or a waterfall. Secondly, from testing we know the inside air is worse than the air outside because airtight buildings that often have insufficient ventilation are combined with building materials that outgas toxic chemicals. Mold growth as a result of moisture damage is also a factor in indoor air quality. All this causes a multitude of body problems such as headaches, asthma, allergies, hormone disorders and even cancer. The symptoms can be much more pronounced in small children, sick people and the elderly. What is the answer?

- Use natural building materials as much as possible.
- Avoid products that have strong fragrances (cleaning, candles, and personal care products).
- Be careful with carpets and plastic building materials, paints and glues.
- Provide plenty of natural ventilation by having windows that can be opened.
- Control moisture sources
- Eliminate combustion gases and toxic pesticides
- Reduce particulates

In Building Biology we promote the “breathing outer skin” which allows the diffusion of water and air molecules through a solid wall. This process helps the air to detoxify. Detailed information and guidelines are provided in our study materials and seminars.
Our advice is to take preventive action rather than waiting until these toxic substances affect your health. IBE provides information for both professionals and lay people which when applied will help to create safe living and working spaces. You can study our printed material, the Online Study Program, or attend one of the Professional Seminars.