

**Module 1: The Perfect Machine**  
**Topic 2 Content: Physical Activity Models Specification Guide**

**Physical Activity Models**





Are you a roadster: one who loves to go out and run around and play and dance? Perhaps you prefer to take the stairs or walk to school. Or are you the show-piece that sits in the garage all the time? Do you get home from school only to plop in front of the computer or television every day? Sometimes the car may look good from the outside, but if it isn't maintained completely, it might have more problems than meet the eye.

Read the specifications on the two models of human bodies: the active model and the sedentary model. Study the effects of active and sedentary lifestyles on your body – your machine.

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### Cardiovascular System

ACTIVE MODEL	SEDENTARY MODEL
 <ul style="list-style-type: none"><li>• Clear blood vessels</li><li>• Strong, efficient heart muscle that moves more blood per beat</li><li>• Decreases and maintains blood pressure</li></ul>	 <ul style="list-style-type: none"><li>• Clogged blood vessels</li><li>• Weak heart muscle that needs to beat more to pump blood</li><li>• High blood pressure</li><li>• Coronary heart disease</li><li>• Stroke</li></ul>

Much like needing to keep the gunk buildup out of your car's engine, you need to keep your arteries clean and clear. Exercise keeps the heart and blood vessels strong and flowing, with fewer problems. Sedentary lives increase the chances of cardiovascular diseases such as CHD or coronary heart disease, hypertension, or stroke.

Coronary heart disease is a condition of the heart where the arteries that supply oxygen and nutrients to the heart muscle are blocked or partially blocked with fatty deposits and plaque, resulting in stoppage or irregular heart rhythm.



Hypertension is often called high blood pressure; this is a cardiovascular disease that is caused by too much blood flow pressure in the blood vessels during and following heart beats.

Stroke is a cardiovascular disease in which blood vessels to the brain are blocked or partially blocked, resulting in brain damage.

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### Digestive System

ACTIVE MODEL	SEDENTARY MODEL
 <ul style="list-style-type: none"><li>• Burns calories to maintain a healthy weight</li><li>• Efficient waste removal</li></ul>	 <ul style="list-style-type: none"><li>• No calorie burning, will cause overweight and obesity</li><li>• Constipation</li></ul>



A vehicle will not gain weight sitting in a garage, but a human will. Exercise burns calories. Additionally, exercise keeps you regular; it makes waste removal more efficient. If your body has too much solid-waste backup, you can become constipated or have difficulty excreting the waste material.

Constipation is a condition in which the large intestine and rectum (or bowels) become dried and densely packed with waste material so that excretion is difficult.

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#### Endocrine System

ACTIVE MODEL	SEDENTARY MODEL
 <ul style="list-style-type: none"><li>• Proper blood sugar</li><li>• Healthy weight</li><li>• Happy lifestyle</li></ul>	 <ul style="list-style-type: none"><li>• Diabetes</li><li>• Low metabolism</li><li>• Depression</li></ul>

The endocrine system sends messages to the body in the form of chemical messengers called hormones. All of the body systems are affected by hormones, and hormone release is affected by need. During physical activity, the body needs more of the hormone insulin to turn sugars into energy. This leads to proper levels of blood sugar and healthier weight. Exercise increases endorphin release, which in turn decreases the occurrence of depression.



Diabetes is a metabolic condition in which the body either does not produce enough insulin (Type 1) or the body rejects the supply of insulin (Type 2), resulting in an irregular level of blood sugar.

Depression is a prolonged period of feeling sadness and worthlessness.

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### Lymphatic/Immune System

ACTIVE MODEL	SEDENTARY MODEL
 <ul style="list-style-type: none"><li data-bbox="285 621 602 657">• Healthier lifestyle</li></ul>	 <ul style="list-style-type: none"><li data-bbox="850 621 1219 657">• Tend to be more sick</li><li data-bbox="850 674 1198 709">• Higher medical bills</li><li data-bbox="850 726 1214 762">• Higher risk of cancer</li></ul>

Like adding nitrous oxide to your car gives it more power, exercise gives a boost to your immune system. The blood increases in volume as a person becomes more fit. The volume is not only for red blood cells, but white blood cells as well. The white blood cells are the germ fighting cells when germs invade the body. People who are less active have more difficulty fighting germs from bacteria and viruses.

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**Muscular System**

ACTIVE MODEL	SEDENTARY MODEL
 <ul style="list-style-type: none"><li>• Stronger muscle, fewer injuries</li><li>• Stronger muscle burns more calories</li><li>• Increases the ability to move</li><li>• Able to be active for longer periods of time</li></ul>	 <ul style="list-style-type: none"><li>• Weak muscles more injury prone when active</li><li>• Muscle atrophy</li><li>• Still muscle don't burn calories</li><li>• Loss of flexibility</li><li>• Loss of endurance</li></ul>

The muscular system is in a win-win situation with more exercise. Stronger muscles mean more muscle mass, more calories burned, and an increased ability to move. It builds upon itself: the more you move, the more you can and want to move, and the more benefits you receive. A sedentary lifestyle leads to muscle atrophy or a decrease in muscle size. With less size, metabolism decreases, and the ability or desire to be active also decreases.

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**Nervous System**

ACTIVE MODEL	SEDENTARY MODEL
 <ul style="list-style-type: none"><li>• More oxygen to the brain</li><li>• Brain acts younger</li><li>• Better mental focus</li><li>• Better decision making</li><li>• Better memory</li></ul>	 <ul style="list-style-type: none"><li>• Shortened intellectual potential (not as smart as you could be)</li><li>• Aging process accelerated</li><li>• Forgetfulness increased</li></ul>

When you exercise, blood flow increases. This stimulates nerve-ending growth in the muscles and the brain; brain activity increases and improves. Sedentary bodies speed up brain-tissue aging and slow brain function.

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**Respiratory System**

ACTIVE MODEL	SEDENTARY MODEL
 <ul style="list-style-type: none"><li>• Stronger lungs</li><li>• Fewer asthma symptoms</li></ul>	 <ul style="list-style-type: none"><li>• Causes more deaths than smoking</li><li>• More occurrences of asthma problems</li></ul>

People who are fit from activity have stronger lungs. Each breath takes in more oxygen; therefore, respiratory rate decreases.



People with asthma also benefit from physical activity. Asthma is a chronic condition that seriously distresses the respiratory system by causing tiny air passages to become narrowed or blocked. The more physically active asthmatics are, the less severe their asthma attacks can be. The reverse is also true: the more sedentary an asthmatic is, the more occurrences and symptoms of an asthma attack are likely.



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### Skeletal System

ACTIVE MODEL	SEDENTARY MODEL
 <ul style="list-style-type: none"><li>• Stronger, more dense bones</li><li>• Fewer fractures</li><li>• Increased calcium in bones for less risk of osteoporosis</li><li>• Improved joint mobility for arthritic people</li></ul>	 <ul style="list-style-type: none"><li>• Weaker bone structure</li><li>• Increased risk of fractures</li><li>• Osteoporosis</li><li>• May feel better short term, but more problems and more arthritic pain</li></ul>

Weight-bearing activities promotes bone density. People who are involved in physical activity, especially strength training, have increased calcium deposits in bone, making them more dense and firm. Activity also increases mobility and decreases symptoms of arthritis. Movement does not need to be high impact or rigorous, especially at first. Intensity can increase as people feel confident in their abilities.

Osteoporosis is a bone condition in which there is mineral loss, particularly calcium, resulting in frail, brittle bones. Exercise helps prevent osteoporosis.