

Tobacco Prevention Demonstrations and Activities

Information on some of the toxins and poisons in tobacco smoke:

- **Carbon Monoxide and Other Poisons**
 - Carbon monoxide (CO) is an odorless, colorless gas that reduces oxygen levels in the blood. CO lessens night vision and hearing and is the same deadly gas found in auto exhaust. Tobacco smoke is full of dozens of poisons, such as arsenic, barium, lithium, copper, lead and xanthine.
- **Nicotine**
 - Nicotine is a poisonous, water-soluble alkaloid found in tobacco leaves and used as an insecticide. One cigarette contains approximately 8 milligrams of nicotine. Nicotine causes blood vessels to constrict, increasing heart rate and raising blood pressure. Nicotine affects the body in only three-and-a-half seconds, and the effect lasts approximately 90 minutes.
- **Tobacco – Tar**
 - Tar is a sticky substance found on tobacco leaves. Tar coats the lungs and air sacs in smokers, preventing them from getting enough oxygen. Tar paralyzes the cilia in a smoker's windpipe so that dust particles and pollen are not swept out of the air passages. Tar contains more than 40 cancer-causing chemicals. Organs affected by these poisons include not only the mouth, vocal chords, throat, and lungs, but also the kidneys, bladder, and uterus and ovaries (in women).

Activities

Lung Capacity

Purpose: To demonstrate and discuss the effects of cigarette smoke on lung capacity.

Equipment:

- 2-liter bottle or 1-gallon jug
- Basin 2/3 full of water
- A bendable straw

Procedure:

1. Fill bottle/jug with water.
2. Hold your thumb over the end of the 2-liter bottle and turn it upside down in the basin, keeping the mouth of the bottle under water. Pressure will keep the water in the bottle.
3. Insert the short end of the bendable straw into the end of the bottle.
4. Ask a child to take a very deep breath and blow into the straw, emptying their lungs into the bottle. The child blows just one long breath.
5. Remove the straw, place your thumb over the end of the bottle, and turn it right-side up.

Key Points:

- The amount of air in the bottle is the amount the child had in their lungs. Smoking and environmental tobacco smoke reduces lung capacity.

Oxygen/Carbon Monoxide Simulation

Purpose: To provide an analogy of how CO mixes easier in the bloodstream than oxygen.

Equipment:

- About ½ tsp. of coffee grounds
- Food coloring (blue or green is best)
- Eye dropper or small straw to pipette a drop of food coloring
- Small, clear bottle with lid, 2/3 full of water

Procedure:

1. Place the coffee grounds in the bottle of water and shake it up. The coffee colors the water very slowly. This represents oxygen in the blood.
2. Now add one drop of food coloring to the same bottle. Note how quickly it colors the water. This represents CO as it enters the blood.

Key Points:

- CO is picked up in the blood 240 times faster than oxygen. The oxygen level drops when carbon monoxide is present.

Simulated Blood Vessel Restriction

Purpose: To simulate the effect of nicotine on the blood vessels.

Equipment:

- 6 or more plastic or styrofoam cups
- 3 or more large diameter straws
- 3 or more very small diameter straws (such as plastic coffee stirrers)
- Water
- Stopwatch

Procedure:

1. Fill all six cups with equal amounts of water. Put the large diameter straws in three of the glasses. Put three very small diameter straws in the other three cups.
2. On the word “GO,” have six children begin to drink as fast as they can (as if it were a race).
3. Time them using the stopwatch.

Key Points:

- It should take twice as long to drink the water using small straws.
- Nicotine constricts the blood vessels which, in turn, decreases the blood flow and makes the heart have to work harder.

Simulated Blood Vessel Restriction/Heart Rate Increases

Purpose: To simulate the effect of nicotine on the blood vessels.

Equipment:

- Small C-clamp
- Bicycle pump

Procedure:

1. One child pumps the bicycle pump. Another child tightens the C-clamp on the pump hose. As the clamp tightens, it will get harder to pump. A third child continually tells the first child to “pump faster.”

Key Points:

- Nicotine makes the heart beat faster and blood vessels smaller, which causes blood pressure to rise.

Obstructive Properties of Tar

Purpose: To demonstrate how an accumulation of tar can inhibit the absorption of oxygen.

Equipment:

- 2 coffee filters
- Water
- Funnel
- Beaker or jar
- Black strap molasses or other tar-like substance

Procedure:

1. Place the funnel in the jar. Line the funnel with filter paper, and pour in the water. Note how quickly it flows through. Remove the wet paper.
2. Coat another piece of filter paper with molasses or other tar-like substance and place it in the funnel. Pour water into the filter, noting how slowly the water flows through the coated paper.

Key Points:

- The filter paper represents lung tissue.
- The water represents oxygen.
- The molasses represents tobacco tar.
- The lungs coated with tar do not exchange oxygen as well as healthy lungs without tar.

Tar's Paralyzing Effects on Bronchial Cilia

Purpose: To graphically show how tar affects bronchial cilia.

Equipment:

- Balls of various sizes

Procedure:

1. Have children form two rows facing each other, gauntlet-style, with hands stretched out and barely touching each other's finger tips. Fingers should be wiggling gently and slowly like cilia.
2. One end of the gauntlet represents the lungs; the other end represents the mouth.
3. The teacher places a ball in the hands of children at the "lungs" end of the gauntlet. The ball is slowly passed through the "mouth."
4. Do the procedure while saying that the balls represent dust, dirt, pollen, and airborne particles that healthy cilia are able to carry out of the airways.
5. Then tell children that the cilia have been exposed to tobacco smoke and are now paralyzed and covered with sticky tobacco tar.
6. The teacher again places the balls in the hands of the children at the "lungs" end of the gauntlet, but the balls stay there because the cilia are paralyzed and sticky.

Key Points:

- Children who are around smokers have a higher rate of respiratory problems because dust and allergic particles stay in the lungs due to cilia paralyzed by tar accumulation.
- Adult smokers must cough forcefully to get the dust and dirt out of their lungs.

Tar Accumulation Over a One-Year Period – "Tar Jar"

Purpose: To show how much tar accumulates in a smoker's lungs over a period of one year.

Equipment:

- A clear half-pint jar
- 8 ounces of black strap molasses

Procedure:

1. Put the molasses in the half-pint jar and use as a display model.

Key Points:

- Eight ounces of tar can accumulate in the lungs of a person who smokes one pack of cigarettes per day for one year. A regular pack includes 20 cigarettes.