

# Smog city 2 from particle pollution

[Countries](#)



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Save Smog City 2 from Particle Pollution Student Worksheet 1.

Access the Smog City 2 web site at [www.smogcity2.org](http://www.smogcity2.org). 2. Select “ Save Smog City 2 from Particle Pollution. ” 3. Once Smog City 2 loads to your computer, take note of the areas of Smog City, including Weather Conditions, Emissions Levels and Population. All areas have “ clickable” choices. Mouse-over or click on the choices. • NOTE: in the information box at the bottom of the screen, there is information about each choice. 4.

Notice how each of the choices are pre-set to a certain level. These are called the default settings. You can use the reset button at any time to return to the default settings. In the chart below, circle or highlight the default setting for each choice. The first setting, Sunlight, has already been completed for you.

Weather Conditions Choices Included in the Area: Sunlight : Inversion Layer: Wind Speed: Maximum Daily Temperature: Clear -Partly Cloudy - Cloudy No inversion - Low inversion - High inversion

Calm - Light Breeze - Breezy - Windy 30? F - 40 ? F - 50? F - 80? F - 90? F - 100 ? F - 110 ? F

Emission Choices Included in the Area: Energy Sources - Cars and Trucks - Off Road Vehicles - Consumer Products- Industry - Some energy sources produce more smog-producing emissions than others. (level 1 is cleaner sources like a wind or solar technology, level 3 produces more smog like a coal-fired power plant) Levels: 1 2 3 This includes Passenger vehicles (all sizes), large and medium trucks, motorcycles Levels: 1 2 3 4 5

This includes airplanes, trains, power boats, earth movers, tractors, harvesters, forklifts, bulldozers, backhoes Levels: 1 2 3 4 5 This includes paint thinner, charcoal lighter fluid, glue or other adhesives, gasoline Levels:

1 2 3 4 5 This includes manufacturing facilities, power plants, oil refineries/storage/distribution centers, food and agricultural processing

Levels: 1 2 3 4 5 Area Name: Choices Included in the Area: Population –

Population in Smog City 2 affects air quality. Changing population, as shown by the “ total emissions” chart and the emission sources in the cityscape, affects VOCs, NO<sub>x</sub> and SO<sub>2</sub>. The compounds react to form ground-level ozone and particle pollution. When temperatures are cool, changing population also changes the usage of wood-burning stoves, which emit particle pollution. In Smog City 2, you can increase the population from near-zero to about two million people. Levels: 1 2 3 4 5 5. Observe the AQI (Air Quality Index) box inside the black box. The default settings, which are circled above, result in a “ red”, or “ Unhealthy” AQI for particle pollution.

The health message is: “ Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion. ”

Scenario 1: Emission Sources

1. Minimize the “ Save Smog City 2 from Particle Pollution! ” instructions at the top of the screen.
2. Turn only Cars and Trucks control to 1. Leave all other choices at the default settings. Record what happens on the Student Worksheet in the table below. Use the reset button to return the Cars and Trucks control to 3, so all controls are in default position. . Turn only Off Road down to 1. Leave all other settings alone. Record what happens on the Student Worksheet. Use the reset button to return the Off Road control to the middle setting, so all controls are in default position.

Energy Sources	Cars & Trucks	Off Road	Consumer Products	Industry	Air Quality Index (AQI)	Color	Message	Value

DefaultRedUnhealthy157 21333YellowModerate80 23133RedUnhealthy158

4. Using the worksheet below, adjust each of the remaining controls noted in red and record the result in the worksheet. Student Worksheet

Energy SourcesCars &TrucksOff RoadConsumer ProductsIndustryAir Quality Index (AQI) ColorMessageValue 23313RedUnhealthy175

23331RedUnhealthy152 13333Red Unhealthy173 5. Move all Emission controls to level 1. What is the AQI? Why? The AQI is green and healthy. The emissions are the main reason for the poor air quality. 6. Using the reset button, return all Emission controls to the middle setting and turn the Population control to level 1. What is the AQI? Why? (Hint: Read “ WHAT IS THIS” in the information box) The AQI is green again.

The reason for this is because when there are less people, there are less emissions as well as less particle pollutions from wood burning fireplaces (when the weather drops below 50 degrees. ) Scenario 2: Weather 1. Using the reset button, return all Emission and Population controls to the middle setting. What is the AQI level? Unhealthy for sensitive groups is the AQI when emissions and population controls are in the middle. 2. Set the Temperature to 80 degrees F. Check the black sign in the cityscape for the temperature. How does this affect particle pollution?

Why? Heat increases the chemical conversion of emissions to ozone and particle pollution. 3. Move the Inversion control to low-altitude (the far right). How does this affect particle pollution levels? Why? Temperature inversions create a warm layer of air above the ground-level ozone that traps pollution. The lower the altitude, the closer to the ground the lid traps the pollution.

<https://assignbuster.com/smog-city-2-from-particle-pollution/>

Questions Based on all the data collected, answer the following questions 1.

Was there any one variable that seemed to have a greater increase in particle pollution than others tested?

Which one? Population made the most impact in either direction quicker than any other factor. 2. What steps could be taken to control emissions levels?

Choose energy sources that are not produced with fossil fuels, telecommute (shop online) instead of taking trips to the mall, recycle, etc. 3. Can you think of ways to reduce particle pollution levels? Keep fire burning to a minimum or use a gas burning fireplace instead, ride a bike, take public transportation, walk, keep “ off road” trips to a minimum, avoid revving engines for longer than 30 seconds when driving, etc.