## **Student Worksheet 12.1E** Electrostatic Precipitators Section 12.1

The electrostatic precipitator shown below uses a negatively charged weight supported by a wire, surrounded by a grounded, positively charged outer duct. The negative charge is so large on the weight that it ionizes the air near it. These ions attach themselves to the particles in the dirty flue gas.

(a) Why is the outer duct grounded? What type of charging is this?

(b) Which way will the negatively charged particles in the flue gas move? Explain your reasoning.

(c) Why don't the particles in the flue gas escape through the top opening?

(d) Why is the outer duct vibrated periodically?

(e) Should all factories that produce dirty flue gas be equipped with electrostatic precipitators? Explain your reasoning.



In this simplified diagram of an electrostatic precipitator, a single grounded duct carries the flue gases loaded with solid waste particles. The weighted central wire acts as a negative electrode to produce a corona discharge. Ions produced in this discharge move across the gas stream and collect on the walls of the duct. The duct is vibrated periodically to shake the residue into a hopper.