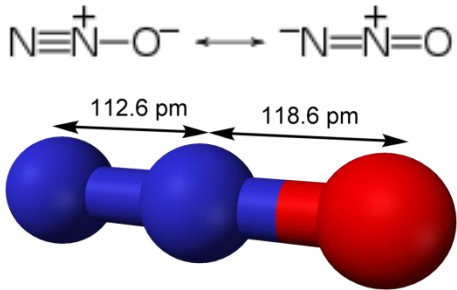
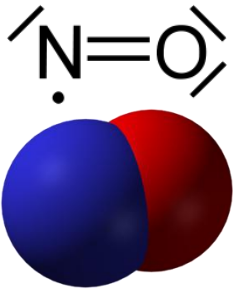
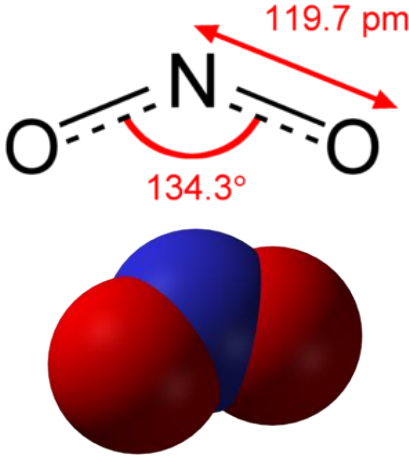
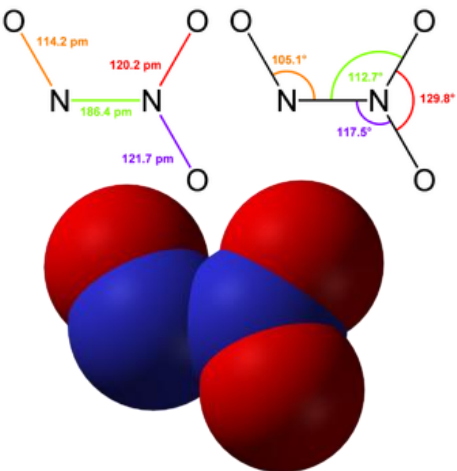


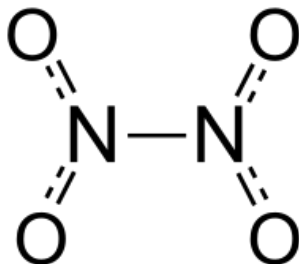
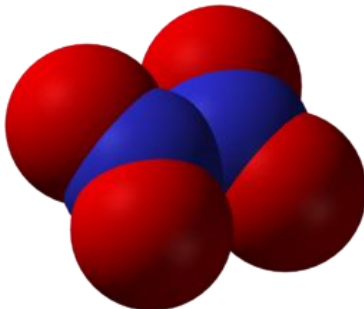
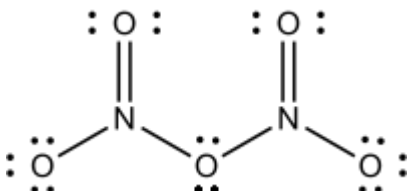
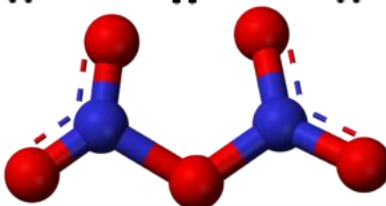
Name: _____

Period: _____

Date: _____

Honors Chemistry Oxides of Nitrogen

Formula	Name(s)	Structure	Properties and description
N ₂ O	Dinitrogen monoxide Nitrous oxide Laughing gas		<p>Colorless gas, slight sweet smell and taste, non-flammable. mp -90.86°C, bp -88.48°C</p> <p>Dissociative anesthetic, analgesic, oxidizer in rocketry and motor racing to increase power (NOS). Whipped cream propellant.</p>
NO	(Mono)nitrogen monoxide Nitric oxide		<p>Colorless gas. Free radical (unpaired electron) mp -163.7°C, bp -151.8°C</p> <p>Byproduct of combustion and electrical discharges, reacts to form NO₂. Intercellular signal molecule, vasodilator.</p>
NO ₂	Nitrogen dioxide		<p>Reddish-brown gas, toxic, sharp odor. Non-flammable. bp +21°C (exists in liquid and solid states only)</p> <p>Air pollutant, greenhouse gas, oxidizer reacting sometimes explosively with hydrocarbons.</p> <p>Produced by high temperature combustion.</p> <p>Highly toxic, causing serious lung damage.</p>
N ₂ O ₃	Dinitrogen trioxide Nitrous anhydride nitrogen sesquioxide		<p>Pale blue liquid, soluble in water. Non-flammable. Sharp, unpleasant odor. mp -100.1°C, bp +3.5°C</p> <p>Reacts with water to form nitrous acid, HNO₂. Used in special purpose fuels.</p> <p>Strong irritant to skin, eyes and mucous membranes. Vapors very toxic by inhalation, may be fatal if inhaled or absorbed through the skin.</p>

Formula	Name(s)	Structure	Properties and description
N ₂ O ₄	Dinitrogen tetroxide When used as rocket fuel, usually referred to as “nitrogen tetroxide” or the abbreviation “NTO”	 	<p>Colorless gas or orange liquid. mp -11.2°C, bp 21.69°C</p> <p>Used as a rocket fuel oxidizer, <i>hypergolic</i> with hydrazine, N₂H₄.</p> <p>On July 24, 1975, NTO poisoning nearly killed the three U.S. astronauts on board the Apollo-Soyuz Test Project during its final descent. A switch left in the wrong position allowed NTO fumes to vent out of the Apollo spacecraft then back in through the cabin air intake vents. One crewmember lost consciousness. The crew was hospitalized 14 days for chemical-induced pneumonia and edema.</p>
N ₂ O ₅	Dinitrogen pentoxide Nitric anhydride Nitronium nitrate Nitryl nitrate	 	<p>Colorless-to-white ionic solid mp +41°C, bp +47°C sublimes +32.4°C, unstable at room temperature</p> <p>Strong oxidizer, forms explosive mixtures with organic compounds and ammonium salts.</p> <p>Implicated in ozone layer depletion.</p>