



## *Nuclear Diplomacy Simulation – General Student Instructions*

Mathematical models and simulations are one of the primary tools scientists use to understand the world around us. Such models are invariably too simple to account for the complexity of reality, but if they capture some essential features of the system being studied, they can help to deepen our appreciation for causes and correlations involved in a system over time. Nuclear proliferation is a geopolitical problem whose future is often modeled and simulated by governments, militaries, academics, and independent think-tanks.

In this activity, you will engage in a simulation of the nuclear proliferation situation in the world today. You and your peers will form five groups, each representing one nuclear weapons state: **China, India, Pakistan, Russia,** and the **United States (U.S.)**. You will engage in a series of negotiation rounds, each representing a 4-year period.

Throughout the simulation, two numbers will be tracked:

**Nuclear Weapon (NW) Count:** This number represents the number of NWs that a country has. In the simulation, countries can choose to increase, decrease, or leave unchanged their NW stockpiles.

- The U.S. can increase or decrease its NW Count by as many as three weapons per round, or leave its count unchanged.
- Russia can increase or decrease its Count by up to two each round, or leave it unchanged.
- All other nations have the capacity to increase or decrease their arsenals by one each round, or leave them unchanged.

**Geopolitical Power Ranking (GPR):** The value of a country's GPR reflects whether proliferation decisions are working in its favor. The GPR for each country will either stay the same or increase over the course of the simulation – the lower a country's GPR is, relative to other countries, the more global decisions have been conforming to that country's interests, and the more geopolitical power the country is perceived to have. You will receive a separate sheet that outlines your country's particular geopolitical goals.

The NW Count and GPR values at the start of the simulation are shown to the right. NW Count values are not proportional to the size of actual nuclear weapon stockpiles.

### Geopolitical Power Rankings (GPR)

Rank	Country	GPR	NW Count
1	U.S.	1	10
2	China	2	3
3	Russia	3	5
4	India	5	1
5	Pakistan	6	1

Here is how a round of the simulation will proceed:

**1. NW Count Decision Stage:**

- Each country will talk internally, and with other nations, about how their NW arsenals should change. On a provided slip of paper, each country will circle how it would like to change its NW Count and the teacher will collect each slip to submit online.
- Note that just as real countries often violate international treaties, oral agreements between participants of the simulation are not necessarily binding, and countries may act contrary to how they say they will.

**2. Nuclear Terrorism Attack Stage:**

- Your teacher will probabilistically determine whether any country will be the recipient of a nuclear terrorist attack. If a country is attacked, its GPR will increase by +4 points, reflecting a decrease in that country's perceived geopolitical power.

- Since greater global proliferation results in an increased risk of nuclear terrorism, a higher total NW Count leads to a higher probability of an attack. The probabilities of a nuclear terror attack occurring are given in the following table:

Total NW Count:	0	1-5	6-11	12-18	19-27	$\geq 28$
Attack Probability:	0	1/32	1/16	1/8	1/4	1/2

- If an attack does occur, countries with a lower GPR, being perceived as more powerful, will have a higher probability of being attacked, with the following chances:
  - 1/2 (50%) – *country with the lowest GPR (perceived as the most powerful)*
  - 1/3 (33%) – *country with 2<sup>nd</sup> lowest GPR*
  - 1/6 (17%) – *country with 3<sup>rd</sup> lowest GPR*

**3. Sanctioning Stage:**

- After GPR values are updated, the three most powerful countries (lowest GPRs) can agree to impose sanctions on the two least powerful countries (highest GPRs). They may choose to sanction both countries, one of them, or none.
- If a country is sanctioned, it must reduce its nuclear stockpile by the maximum possible amount on its next turn or its GPR will increase by +2 points.

This process will repeat for around 4-5 rounds.

You will receive your country-specific GPR guidelines and a policy-brief with strategic considerations on a separate sheet of paper. Good Luck!