Uranium

1. Uranium is the only naturally occurring material that can be used to make an atomic bomb.
2. Canada was a partner with the USA and the UK in developing the world's first atomic Bombs.
3. Canada's involvement was considered necessary since Canada had easy access to uranium.
4. Uranium from Canada's NWT and the Congo was processed at Port Hope, Ont. for WWII Bombs
5. The Hiroshima Bomb was a simple device made from highly enriched uranium (a gun-type Bomb).
6. All Canada's uranium was sold to the military for nuclear weapons from 1941 to 1965 – 23 years.
7. In 1965 Prime Minister Pearson ruled that Canada's uranium will be sold only for peaceful uses.
8. Canada remains the world's second largest producer and exporter of uranium after Kazakhstan.
9. When mined from the Earth, "natural uranium" is 0.7% uranium-235 and 99.3% uranium-238.
10. Uranium-235 is the "chain reacting" kind of uranium, whereas uranium-238 is not chain-reacting.
11. A nuclear chain reaction releases enormous energy through the process of nuclear fission: neutrons split heavy atoms, releasing more neutrons to split even more heavy atoms, and so on.
12. An atomic bomb uses an uncontrolled nuclear chain reaction to create a devastating explosion.
13. A nuclear reactor uses a controlled nuclear chain reaction to boil water and generate electricity.

Enrichment

14. Any technology that increases the concentration of uranium-235 is called "uranium enrichment".
15. If the concentration of uranium-235 is 20% or more, it is called "highly enriched uranium" (HEU).
16. The uranium in the Hiroshima Bomb was over 90 % uranium-235 – "weapons grade" uranium.
17. Most nuclear power plants are fuelled by "low enriched uranium" (LEU), but not highly enriched.
18. Low enriched uranium (normally between 3 to 5 percent uranium-235) is not weapons-usable.
19. Natural uranium can fuel a nuclear reactor if "heavy water" or "graphite" slows down the neutrons.
20. Many proposed nuclear reactors plan to use uranium enriched between 5 and 20% uranium-235.

Plutonium

21. Uranium is the only naturally occurring material that can be used to fuel a nuclear reactor.
22. Plutonium is a uranium derivative that can also be used to fuel a reactor or make an atomic bomb.
23. Plutonium is not naturally-occurring; it is created as a byproduct in uranium-fueled nuclear reactors.
24. The first nuclear reactors, including Canada's first, were used to produce plutonium for bombs.
25. From 1947 to 1965 Canada sold plutonium produced at Chalk River for weapons use by the USA.
26. In 1974 India exploded its first atomic bomb using plutonium from a Canadian reactor given as a gift.

Reprocessing

26. For weapons use, plutonium has to be extracted from the extremely radioactive used nuclear fuel.
27. Any technology to separate plutonium from radioactive wastes in used fuel is called "reprocessing".
28. Reprocessing is used to obtain plutonium for nuclear weapons of all kinds including H-Bombs.
29. Since plutonium can be used to fuel a reactor, there is a commercial interest in reprocessing also.
30. Reprocessing is very expensive and produces largely intractable forms of liquid radioactive wastes.
31. Plutonium that has been obtained for civilian use can be diverted to make nuclear weapons
32. Plutonium is extremely toxic, but relatively easy to hide and can be smuggled across borders.
33. Unlike uranium, plutonium needs no enrichment, because all plutonium is chain-reacting in bombs.
34. Once created, stored plutonium is indestructible and lasts for hundreds of thousands of years.
35. Any regime, thousands of years from now, can use the plutonium in nuclear fuel waste for bombs.