Isotope card game. Rules.

Introduction

- The cards have the name of an isotope in large type.
- The aim of the game is to make ‘tricks’ by making complete equations consisting of a radioactive isotope, its daughter product and the correct radiation.
- It is best if the pupils play in pairs (one pair against another pair - this helps them hold the cards and makes them discuss the physics).
- Each card has the stable isotopes of that element (if it has any) at the bottom. This is so that players can determine what type of decay is likely to occur.

Playing the game - basic

1. Each team is dealt 12 cards from a shuffled pack.
2. Teams take it in turns to put down a card on the desk (face up and not in a pile) and replace it with one from the pack. The cards will start to accumulate on the desk. These are available for either team to access.
3. If they see an opportunity to make an equation using a card on the table along with two cards in their hand, they can put down those two cards.
4. They should read out the equation. E.g. “Carbon 14 decays to nitrogen 14 by beta minus decay”.
5. a) If they are correct, they pick up this ‘trick’ of three cards and keep it separately.

   b) They then pick up two more cards and continue with their turn – i.e. make another trick or play one card onto the desk (which they replace from the pack).
6. If they are incorrect, the other player picks up the trick but keeps it in their hand (it isn’t a trick but it gives them more cards to play with – i.e. they gain an advantage from the physics error of the other team). From then on, their hand will always have three more cards.
   Common errors are:
   - getting the equation wrong in that it doesn’t balance;
   - getting a beta decay equation the wrong way round with the wrong type of decay (e.g. stable nitrogen-14 decaying to carbon-14 by beta plus when it should be the other way round).
7. The players keep trying to accumulate tricks until the pack runs out.

Playing the game - Subtle

8. When all the cards have been taken off the pack, players must play radiation cards rather than isotopes. They should put down the type of radiation that they have the most of.
9. When they have run out of types of radiation, they start putting down isotopes again.
10. At this stage, players can match cards on the table if the other player has missed a trick. And they can play cards from their hand as before.
11. The end of the game is reached when no more equations can be made from the cards on the table. There may be some left over because of alpha decay sequences or because a wrong trick has slipped through the net.
12. The winner is the player with the most tricks.
13. The game can be played as a knock out tournament within the class. There are three different sets of cards - one for each round. The first set has no beta plus radiation to keep the physics of the first round simpler whilst the players are getting to grips with the rules.