

# CNO Card Game Instructions

The object of the game is to score the most points either in a single round or over a series of rounds. Points are scored by playing cards following the **CNO** cycle. The gameplay is very similar to double solitaire, but can be played with more than 2 players per game. Print pages 2-6 on cardstock to make ONE deck. Each player will need their own deck. Players in a single game will need decks of different colors for scoring purposes.

## *SETUP*

Both players shuffle their decks. Each player counts out 15 cards face down. This becomes their HAND. The remaining cards become the STOCK. Four cards from the stock are laid out, face up, in front of each player. These four spots are the PLAY ROW. The top card of the stock is always visible, as is the top card of the hand.

## *PLAY*

From their stock, play row, or from their hand, players play cards onto reaction piles in the center of the table building from Carbon-12 ( $^{12}\text{C}$ ), to Neon-20 ( $^{20}\text{Ne}$ ).

The maximum number of reaction piles is 2X the number of players. Players play cards onto the reaction piles so as to follow the chain of reactions in the CNO cycle. Each card in this set has one or more isotopes listed in the upper lefthand corner as an aid to indicate which card(s) can be played next.

Players may play cards directly from their play row. That slot on the row is replaced by the top card of the stock, and the top card of the stock is flipped over.

Players may play cards from their hand by cycling through the cards in their hand one-by-one. Once a player has cycled through all of the cards in their hand, they can begin again at the start of their hand. This can be repeated any number of times.

At any time, a player may remove a Neon-20 card from the play row, top of the stack, or their hand and it will not count for or against them (see SCORING below).

Once a Neon-20 card is placed on top of a reaction pile, no new cards may be played on that pile. The pile still counts as a reaction pile with respect to the maximum number of allowed piles (2X the number of players).

Whenever a player exhausts his/her stock, or empties his/her hand, that player may declare "Done". At that point, the round ends and the points are tallied. A player does not have to declare that they are done upon emptying the hand, and they may continue to play cards.

## *SCORING*

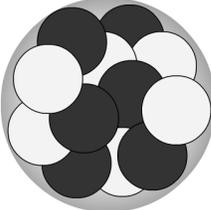
For each card played onto a reaction pile, the player who played it gets two (2) points. For each card remaining in his/her hand, play row, or stock, a player loses one (1) point. For each card in a reaction pile topped by a Neon-20 card, the player who played the Neon-20 card gets one (1) point. The player with the most points wins the game.

## *SPECIAL RULE*

In the event that no player can make a legal play from the play row or hand, AND all players still have cards in their hands and stock, the top card of the stock and the cards in the play row are placed on the bottom of the stock, a new play row is laid out, and the new top card of the stock is turned face up. This process repeats as necessary. If no player can make a legal play from the play row or hand, but one or more players do not have cards remaining in either their hands or stock, the game ends.



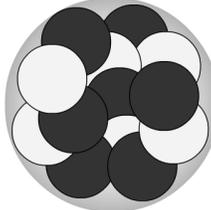
**$^{12}\text{C}$**



$^{12}\text{C}$  is a stable isotope and is the most abundant isotope of Carbon.



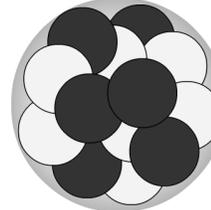
**$^{13}\text{C}$**



$^{13}\text{C}$  makes up a little over 1% of the natural Carbon found on Earth.



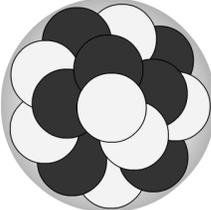
**$^{13}\text{N}$**



$^{13}\text{N}$  has a half-life of just under ten minutes and decays into  $^{13}\text{C}$ .



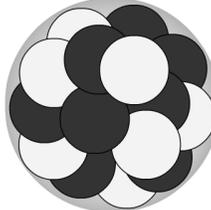
**$^{14}\text{N}$**



$^{14}\text{N}$  is the most common isotope of Nitrogen found on the Earth.



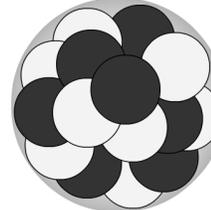
**$^{15}\text{N}$**



$^{15}\text{N}$  makes up less than 1% of all naturally occurring Nitrogen on Earth.



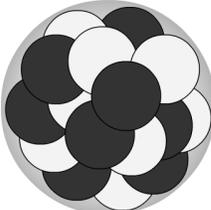
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$^{15}\text{O}$  is a rare, unstable, isotope of Oxygen. It will decay into  $^{15}\text{N}$ .



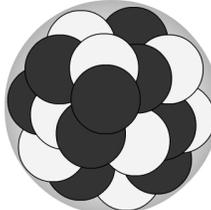
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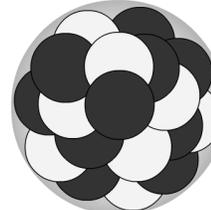
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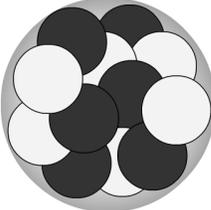


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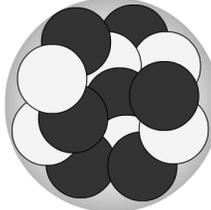
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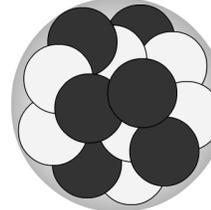
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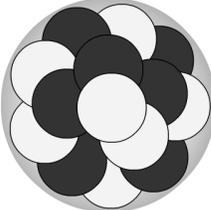
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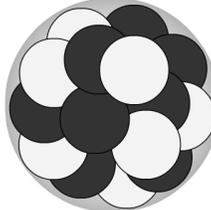
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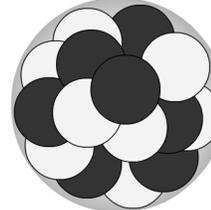
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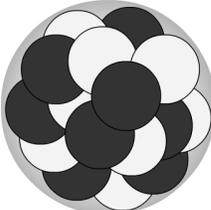
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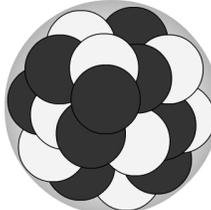
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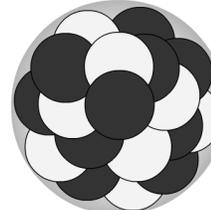
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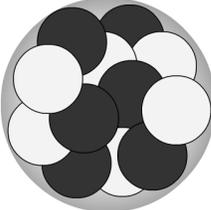


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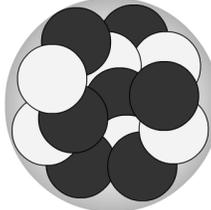
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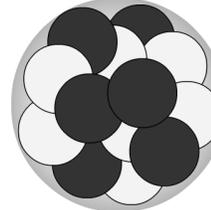
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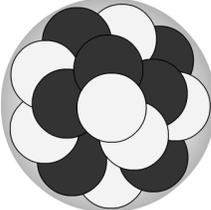
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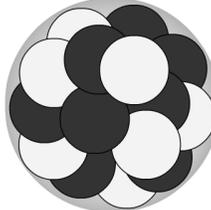
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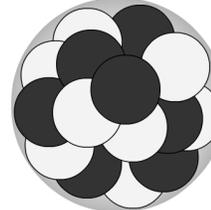
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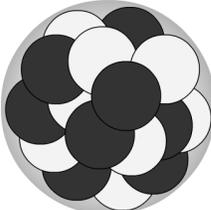
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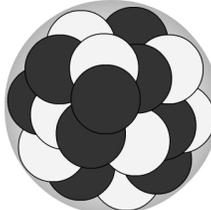
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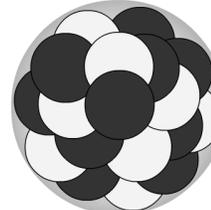
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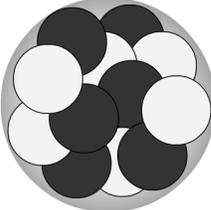


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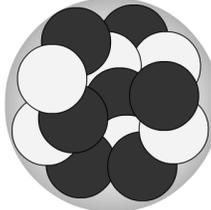
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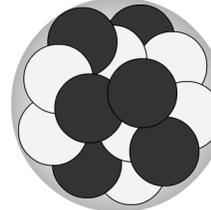
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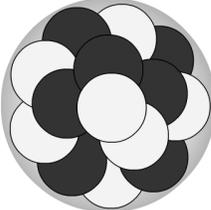
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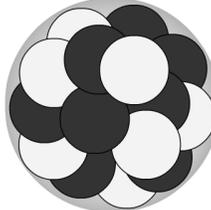
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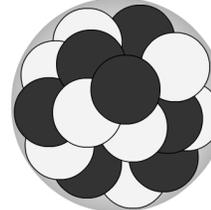
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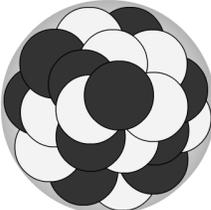
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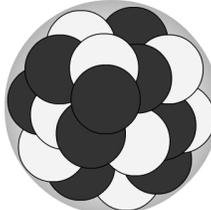
**$^{20}\text{Ne}$**



$^{20}\text{Ne}$  made in the CNO cycle does not participate in Hydrogen burning.



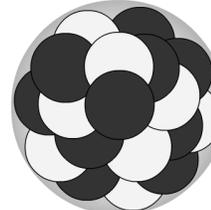
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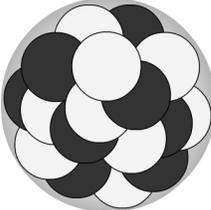


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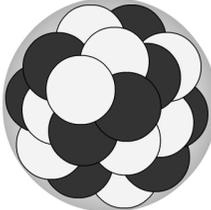
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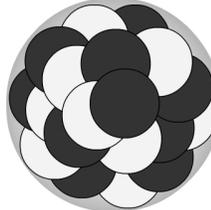
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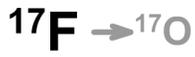
$^{18}\text{F}$  has a half-life of 110 minutes.



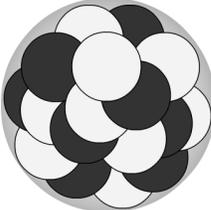
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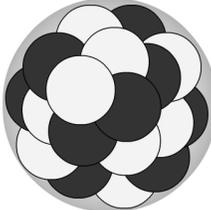
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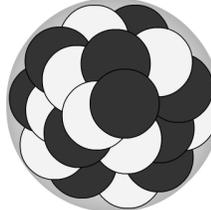
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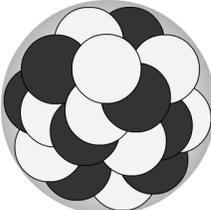
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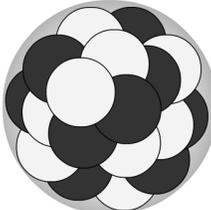
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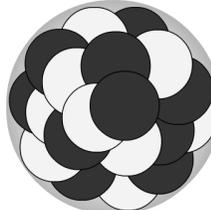
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