Deduction (Coco rating: 4) Learning: Complex

Cooperation Panorama: Communal (Work together to collectively figure out a card's identity)
Interaction: Teamwork through communication and deduction (ideally, 9 players)

Description:
After a complex set-up by a non-playing party, 9 hands are deal out with partial information about the identity of the hidden Complete card. If nine players are playing, they each get a hand, if fewer than nine are playing, then everyone gets one hand, and some hands are left to select later. Players look at their hands, and using the information contained, ask questions or make statements to share or collect information from the other players. By judiciously combining this information, they attempt to collectively identify the hidden card. If they cannot reach consensus, they can turn over a clue from the clue pile. They can reveal up to three clues before declaring the identity of the hidden card. Correct identification means everyone wins, incorrect means everyone loses. Correct guesses with fewer (or no) clues make for more gratifying victories.

Objective:
Collectively, the group, by making statements and asking questions of each other, attempts to determine the identity of the hidden Complete card. If they do, the game is won. A clues are available if the group in stuck.

Set-up: (this is the complex part)
IMPORTANT: All these steps must be done by the non-playing Game Master (GM) for the benefit of the rest of the players. None of the players can observe this process!
1.) Selecting the hidden card to deduce
   a. Shuffle all the Complete cards.
   b. Sort all the Single cards into 9 groups of 4 matching cards each (4 Reds, 4 Greens, 4 Circles, etc.)
   c. Select one Complete card from the shuffled deck. This is the hidden card that must be deduced. Place it face-down off to the side.
2.) Making the player hands: part 1
   a. Deal out 9 True cards face-up
   b. Take the 3 groups of four Singles that match the hidden card. (e.g. if the hidden card is a Hollow-Red-Circle, get the 4 Hollow Singles, the 4 Red Singles, and the 4 Circle Singles.
   c. Shuffle these 12 cards together and deal one on top of each True card. There should be 3 remaining
   d. Crucial to the Game: The GM must randomly determine how many of these remaining three cards should be set aside and how many should be dealt to True hands. This MUST be done randomly, and the GM MUST not tell the players how many were used. The recommended approach would be to flip a coin for each of the three cards. If the coin comes up heads, then roll a 9-sided die to determine which pile the card goes in. If tails, put the card aside, it is no longer part of the game. (NOTE: unintentional mixing of these cards with other cards in the game can ruin the deductive logic.)
   e. Take all the remaining Singles (NOT the ones that were eliminated in step d.) These are the 6 groups of four that do not match the hidden card). (e.g. if the Hidden card is the Hollow-Red-Circle, this pile will consist of 4 Partial Singles, 4 Filled Singles, 4 Green Singles, 4 Blue Singles, 4 Square Singles, and 4 Triangle Singles.) Fully shuffle these cards.
   f. Deal from this deck cards face-down onto the hands until every True card has three face-down cards with it. (In some cases, the hand will get two additional cards; in others, it could get only one. In very rare cases it could get none.)
   g. The remaining 9 Single cards form the clue deck. Shuffle this place near the center of the table.
   h. Remove the True cards from the hand.
3.) Making the player hands: part 2
   a. Shuffle all the other 26 Complete cards and deal two face-down on every hand.
   b. The leftover Complete cards (there will be 8 of these) are no longer in the game.

c. Give one of these 9 hands to each player. If there are any leftover hands – meaning there are fewer than 9 players, put those hands aside to be looked at later in the game.

4.) Initiating the Game:

a. Each of the 9 players now has a hand (3 Single cards and 2 Complete cards.

b. The game is ready to begin. Players may look at their hands. They cannot show their hands to any of the other players. They can only discuss their hands in the manner described in the Gameplay section.

c. Every hand has at least one Single card that matches the hidden card.

d. Every hand has two Completes that are not the Hidden card.

e. Players leverage this knowledge, logic, and information gathered from other players to deduce the identity of the hidden card.

Gameplay:

All players are allowed to make one statement about their hand. This can be done in any order. The statements must contain only one piece of information. "I have no Blue Singles in my hand", "Both my Complete cards are Circles", or "I have the Hollow-Green-Square".

The next round each player may ask one specific question of one other player – only that player may answer. Again, this can be done in any order. These questions must be answered with either "yes", "no", or with a number. For example, "How many of your Complete cards are Hollow?", "Do you have a Green Single card?" "Are any of your Single cards Colors?" The player answers the question accurately, and the other players can hear the answer.

Now the group can discuss the information gathered in the first two rounds and make deductions.

To make deductions, it is important to know the following information:

1.) There are 9 characteristics (Filled, Partial, Hollow, Red, Green, Blue, Circle, Square, Triangle)

2.) There are four of each of these Singles in the deck.

3.) All four Singles of the three characteristics of the hidden card will be distributed among the hands.

4.) Of the 27 Singles among the hands, 12 contain valid information about the hidden card, and 15 are "red herrings" containing incorrect information that should be ignored.

5.) There are 27 unique Complete cards. There are a total of nine that exhibit each of the 9 characteristics. (i.e. There will be nine Complete cards that are Hollow: Hollow-Red-Circle, Hollow-Red-Square, Hollow-Red-Triangle, Hollow-Green-Circle, Hollow-Green-Square, Hollow-Green-Triangle, Hollow-Blue-Circle, Hollow-Blue-Square, and Hollow-Blue-Triangle)

6.) Of the 26 incorrect Complete cards, there will be 18 among the players' hands and 8 out of the game.

When making deductions, players cannot reveal any information about their hands that was not shared in the first two rounds. However, they can (and should) share any deductions that they can make based on the shared information and their hands without giving away any new information.

Example:
A player has two Square Singles and a Blue Single. Another player states that the hidden card cannot be a Square.

An Unacceptable Deduction:
"I have two Square Singles and a Blue Single, and you said that it cannot be a Square, so the hidden card must be Blue."

Corresponding Acceptable Deduction:
"The hidden card must be Blue."

Another Example:
A player has the Filled-Blue-Circle and the Hollow-Blue-Circle. Another player states the hidden card is Blue. A third player says the hidden card is a Circle.

An Unacceptable Deduction:
"I have both the Filled-Blue-Circle and the Hollow-Blue-Circle, so the hidden card must be the Partial-Blue-Circle."
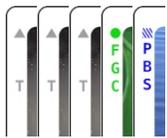
Acceptable Deduction:
"The hidden card is the Partial-Blue-Circle"

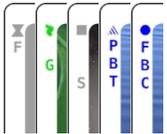Each deduction can set off a cascade off other deductions until all 3 characteristics of the hidden card are known.

Primary Deduction Examples:

Scenario A:

If a player has three Single cards that are the same, then the hidden card must match that characteristic.

Scenario B:

During the first two rounds, it comes out that there are 7 Complete cards among the players that are Blue. One player, who did not share anything about their Complete cards, has two more that are blue. Thus all 9 Complete cards that are blue have been accounted for and therefore, the hidden card cannot be blue. That player can now say, "The hidden card is NOT Blue!"

Scenario C:
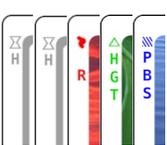
During the first two rounds, it comes out that 7 of the 9 players do not have any Square Singles. Of the two remaining players, one of them also has no Square Singles, though this has not been shared with the group. That player knows that if the hidden card is a Square, there must be four Square Singles among the group. This cannot be, because the other player can only have three! Therefore, they can deduce that the hidden card is NOT Square and share that with the group.

Scenario D:
During the first two rounds it comes out that there are four Filled Singles among the group. It also comes out that there are fewer than four Hollow Singles, and fewer than four Partial Singles. This means that the hidden Complete card must have the Filled characteristic. Any player who realizes this can make that claim.

Scenario E:
During the first two rounds it comes out that none of the players have a Complete card that contains a Triangle. This means that the 8 Complete cards that are out of the game AND the hidden Complete card must all be Triangles. Any player who realizes this can make the statement: "The hidden card is a Triangle!"

Scenario F:

It comes out during the first two rounds that the hidden card is not a Triangle. If another player has these Singles: Red, Green, and Triangle, they can immediately deduce that the Color of the hidden card is not Blue. If it were, then they would not have any Singles that are true. They can share this with the group.

Scenario G:
Not enough corresponding information comes out during the first two rounds for anyone to make any solid deductions. The group realizes this and collectively agrees to flip over a clue card. Whatever card is revealed, the entire group now knows that that characteristic cannot belong to the hidden card.

Secondary Deduction Examples:
These kinds of deductions come after a primary deduction has been made and can set off a cascade of inferences that lead to discovery of the identity of the hidden card.
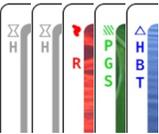
Scenario H:
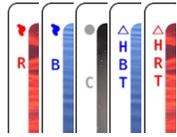
 Someone announces that the hidden card is Green. Another player's hand has three Single cards: Blue, Red, and Circle. Since they know Blue and Red are not valid and that at least one of their Single cards is accurate, the hidden card must also be a Circle. They can make this announcement to the group.

Scenario I:
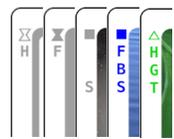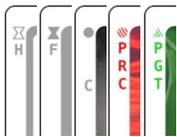
 One player has a Hollow, a Filled, and a Circle. They can say to the group that if the hidden card is Partial, then it must also be a Circle. If another player has Hollow, Filled, and Square. Then they can say that if the hidden card is Partial, then it must also be Square. These two statements are contradictory, so the assumption must be false. The hidden card cannot be Partial.

Scenario J:

 Someone states that the hidden card is not Hollow. Another player's Single cards are two Hollows and a Red. They can now announce that the hidden card must be Red.
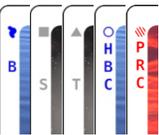
Scenario K:

 Someone states that the hidden card is not Green. Someone else states that the hidden card is not a Square. A third player's Single cards consist of Green, Square, and Partial. They know that the hidden card must be Partial and can state that.

Scenario L:
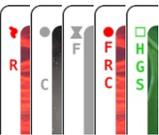
 Someone announces that the hidden card is Green. Someone else announces that the hidden card is a Triangle. A third player has a Red Single, a Circle Single, and a Filled Single. They can announce that the hidden card must be the Filled-Green-Triangle.

Scenario M:

 Someone announces that the hidden card is Hollow. Someone else announces that the hidden card is Blue. A third person has the Hollow-Blue-Circle, so they can announce that the hidden card is not a Circle.

Scenario N:
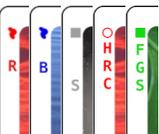
 It is stated that the hidden card is Filled and that the hidden card is a Square. Another player announces that the hidden card cannot be Blue. Another player has the Filled-Green-Square, so they announce that the hidden card must be the Filled-Red-Square by process of elimination.

Scenario O:
No one can make any deductions, so the group decides to reveal a clue: a Triangle Single. Everyone now knows that the hidden card cannot be Triangle. But still no deductions can be made. So, another clue is revealed. It is also a Triangle Single. This does not count as a second clue and cards from the clue deck can now be flipped over until one that is not a Triangle is revealed.

Game End:
The game ends when the players feel they have determined the identity of the hidden card. They make their collective deduction and reveal the hidden card. If they are correct, then everyone wins, noting how many clues were required. If they are incorrect, everyone loses.