Overview

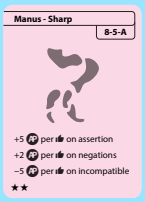
You are paleontologists on a new planet working together to dig up an animal's remains, but the specimen you are excavating is incomplete! You must use information about living animals on that planet to make **arguments** about the specimen and earn Argument Points (AP). Earn more AP from thoughtful arguments, but be careful not to lose AP from careless guesses! The player with the most AP after 6 turns wins.

Materials

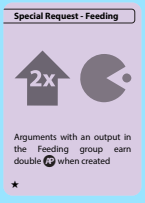
- 2 touchscreen devices, each with *The Big Dig* companion app installed
- 1 game board
- 1 turn marker (small cylinder or coin)
- 4 excavation decks, each consisting of 8 attribute state cards, 2 special request cards, and 15 rock cards
- 2 sets of decision cards, each consisting of 2 action cards and 1 pass card
- 2 sets of evaluation cards, each consisting of 3 cards (add, move, and remove)
- 50 attribute state markers (30 colored small cubes and 20 colorless small cubes)
- 24 confidence tokens (two differently colored sets of 12 small dice)
- 20 blank cards, a pack of colored sticky tabs, and a writing tool for recording arguments
- Dice or pen and paper to record score

Specimen Cards

Excavation decks contain three kinds of cards:



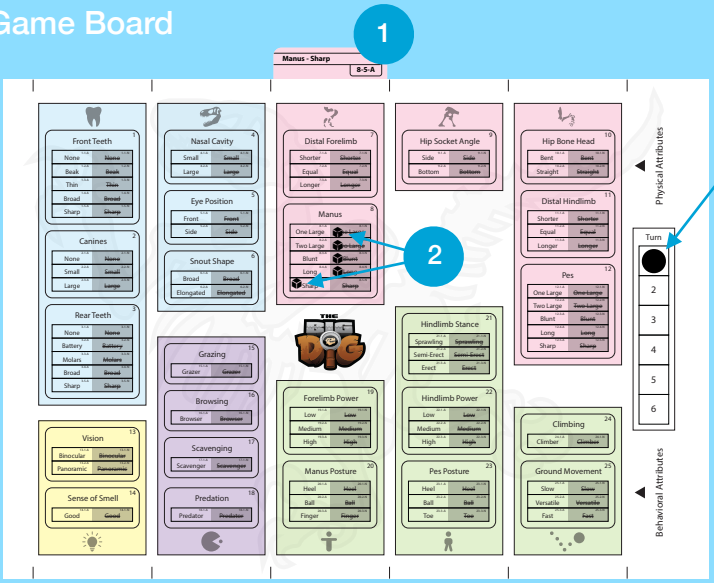
Attribute States are parts of the specimen that you might discover during the game. They will always be states for physical attributes (those along the top of the game board) and will not be behavioral attributes (those along the bottom of the game board).



Special Requests give players bonus AP each time they create a new argument on a certain part of the board. If there is already a special request in play when a new one is drawn, the old one is discarded and no longer adds bonus AP.

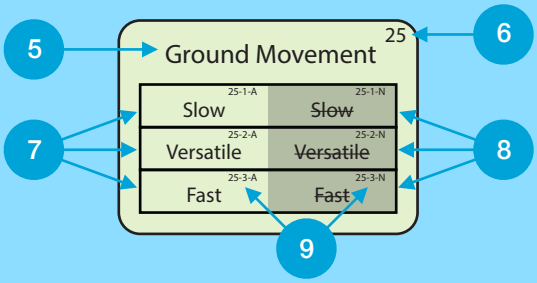
Rocks do nothing, and are discarded face up when drawn.

The Game Board



1. Attribute state card
2. Attribute state markers
3. Turn marker
4. Excavation deck

Rounded rectangles on the board are the specimen's **attributes**. Each attribute has different possible values, or **states**, represented as rows in the attribute table. Each state has an **assertion** and a **negation** space (negations use ~~strikethrough~~ text).

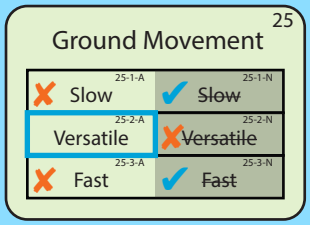


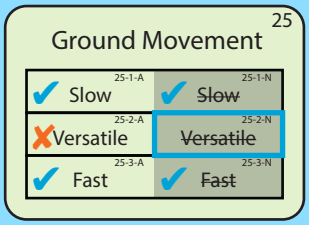
5. Attribute name
6. Attribute number
7. Attribute state assertions
8. Attribute state negations
9. Attribute state codes

Compatible and Incompatible Spaces

Players are allowed to make different guesses about attributes during the game. The compatibility of those guesses determines how to resolve disputes and earn AP. Each assertion is **incompatible** with other spaces i the same row or column, but is **compatible** with other spaces. All negations are **compatible** with each other.

Example





*If ground movement were versatile, it could not also be slow, fast, or **not** versatile, but it could be described as **not** slow or **not** fast. On the other hand, if ground movement were **not** versatile, it could still be slow, fast, **not** slow, or **not** fast.*

Attribute State Markers

Attribute state markers represent what things you have discovered (colored, 📦) or guessed (colorless, 📦). You use them to make arguments about new guesses.

- During the game, each assertion or negation space on the board may have no more than 1 attribute state marker, either 📦 or 📦.
- During the final scoring procedure, players who created arguments in support of the best 📦 or 📦 for each attribute earn bonus AP.

Confidence Tokens

You can place confidence tokens (👍) on the board to express confidence that the specimen has or does not have particular attribute states.

- When an attribute state is discovered, you can gain or lose AP if you have 👍 on the attribute.
- During Final Scoring, you can gain or lose AP for each 👍 you have on the board, depending on whether there is 📦 in the same space.
- During Final Scoring, each 👍 contributes to the support of 📦 in the space.

Setting Up the Game

- Distribute one set of decision cards and one set of evaluation cards to each player.
- Distribute one set of 👍 to each player to be used as that player's bank.
- **If this is your first game, select the starter excavation deck** (i.e. the set of cards marked with a ★); otherwise, randomly select an excavation deck.
- **If this is your first game. select the starter discovery** (the card marked with ★★).

  Otherwise randomly select one of the attribute state cards from the excavation deck to be the initial discovery. Place the initial discovery card next to the game board, aligned with the column for its attribute.
- Place a 📦 on the assertion space for the starter discovery on the game board, as well as 📦 on spaces for compatible negations.
- Shuffle the remaining 7 attribute state cards into the excavation deck and place it face down next to the game board.
- Start *The Big Dig* companion app on each player's individual touchscreen device.
- Begin the first turn as described i the Turn Sequence rules.

Turn Sequence

1. Begin Phase

- Place the turn marker on the current turn number's space on the game board.

2. Excavation Phase

- If any cards remain in the excavation deck, draw the top card and resolve it.
  - If it is an attribute state, discover it.
  - If it is a special request then place it face up next to the game board. If another special request was already active, then discard that one face up next to the excavation deck.
  - If it is rocks, discard it face up next to the excavation deck.

3. Model Phase

- Each player creates on model using the companion app.
  - The model may use any valid combination of attribute states.
  - These states may have 📦, 📦, or neither on the board.

4. Decision Phase - Argumentation

- Both players simultaneously spend **one of their decision cards**.
  - Players who decide to act create a new argument using one of their models from the companion app.

5. Decision Phase - Research

- Both players simultaneously spend **one of their remaining decision cards**.
  - Players who decide to act create one additional model as in the Model Phase.

6. Decision Phase - Exploration

- Both players simultaneously spend **their remaining decision cards**.
  - Players who decide to act draw a card from the excavation deck as in the Excavation Phase.

7. Evaluation Phase

- Both players simultaneously spend **one of their evaluation cards** to perform one action:
  - **Remove** any number of their own 👍 on **any one attribute**.
  - **Move** any of their own 👍 on any attribute to other spaces **on the same attribute**.
  - **Add** 1 👍 to any one assertion or negation space without a 📦.

8. End Phase

- Return all decision and evaluation cards spent during this turn to their respective owners.
- If the game was on turn 6, end the game and go to Final Scoring; otherwise, move to the next Begin Phase.

Final Scoring

Use the following steps to determine AP bonuses at the end of the game.

Nullifications

1. For **all valid nullifications** on the board **using only discovered states as inputs** (i.e. states with ◆), invalidate the arguments they nullify.
2. Continue invalidating any arguments whose inputs **no longer have** ◇ **or** ◆ on their space, until only arguments whose inputs hav e a ◇ or ◆ remain.
3. **Each valid nullification** remaining on the board earns its creator 5 AP.

Wild Guesses

4. For **each** 👍 **on the board without a** ◇ on the same space, **deduct 1** AP from its owner down to a minimum of 0.

Best Guesses

For each attribute on the game board with more than one ◇:

5. Compute a **support value for each** ◇ on the attribute:
   5.1. For each **valid conjecture whose output matches the space with the** ◇, if that conjecture is **not targeted by any valid nullification**, add 1 point for each point of support on its model prediction.
   5.2. **Multiply** this value by the number of 👍 on the same space as the ◇.
6. **Remove all** ◇ from the attribute **except that with the greatest support**, or those tied for the greatest support.

Confident Guesses

For each ◇ remaining on the game board:

7. Each 👍 on the attribute that is **compatible with** the space with the ◇ earns its owner **1** AP.

Valuable Contributions

For each ◇ or ◆ remaining on the game board:

8. Each **valid conjecture whose output matches the space with the** ◇ **or** ◆, if that conjecture is **not targeted by any valid nullification**, earns its creator **5** AP.

Tips

Create Arguments

Creating arguments not only earns out AP, but also lets you add ◻ to the board. Don't forget you can use these ◻ as inputs to make new arguments!

Models Do Not Require Two Inputs

When you create new models in the companion app, **you can select either one or two inputs**. If you are having trouble finding useful predictions when you select two inputs, you can try using a single input. Just remember that arguments with only one input might be vulnerable to nullification.

Negations May Be Used As Inputs

Remember that **negation** spaces can also have ◻ or ◼ on the board, so you are allowed to use them as inputs to create arguments.

Models Can Be Saved For Later

You get to create at least one model every turn. If it won't let you create an argument, look back at your **older models** during the argumentation phase to see if one of them is useful now. You can use this strategy to create models during the research phase to try to plan a few steps ahead.

Nullifications Can Invalidate Other Arguments

Predictions with **0 support** can be used to create nullifications of conjectures on the board that use only one input. Nullifications might invalidate those conjectures during the final scoring procedure, **as well as other arguments that rely on them**!

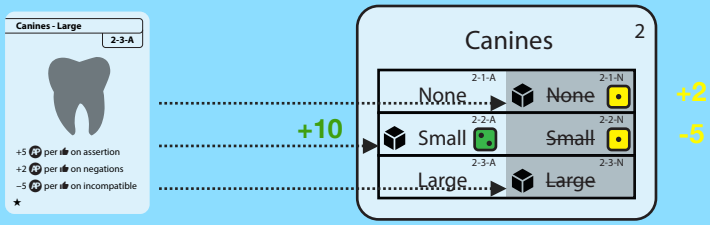
Reference

Discovering a Physical Attribute State

1. Place the attribute state card above the game board, aligned with the column where its attribute is.
2. Remove all 📦 from the discovered attribute.
3. Place a 📦 on the assertion space for the discovered state, as well as 📦 on spaces for all compatible negations on that attribute.
4. Owners of 👍 on the a**ssertion space gain 5 AP per 👍**.
5. Owners of 👍 on **compatible negations gain 2 AP per 👍**.
6. Owners of 👍 on **any spaces incompatible** with the discovered state **lose 5 AP per 👍** down to a minimum of 0 AP.
7. Return all 👍 on the attribute to their owners' banks.
8. Invalidate all arguments that use an assertion or negation on this attribute as inputs or outputs, if that assertion or negation has no 📦 on its space.

Example

*The hello player has 1 👍 on 2-1-N (canines **are not** none) and 1 👍 on 2-2-N (canines **are not** small) while the green player has 2 👍 on 2-2-A (canines are small).*



*The top card of the excavation deck is drawn and is 2-2-A (canines **are** small). The yellow player gains 2 AP for correctly guessing that the canines were not none, but also loses 5 AP for incorrectly guessing that they were not small, resulting in a net loss of 3 AP. The green player gains 10 AP for correctly guessing the canines were small.*

Simultaneous Decisions

Sometimes players must simultaneously spend cards to commit to actions before proceeding. (Phases 4, 5, and 6 use **decision** cards. Phase 7 uses **evaluation** cards.)

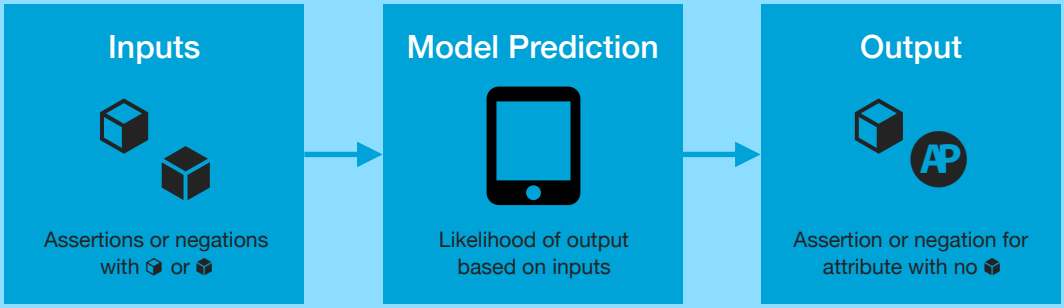
To do so, players secretly select which card they will spend and place it face down in front of themselves. When both players have placed a card, they turn their cards over to reveal their decisions. They then perform the action indicated (or do nothing when playing the **Decision - Pass** card).

Cards spent to make simultaneous decisions **may not be reused for the rest of the turn**. Players receive them back during the End Phase (8).

Argument Basics

An argument consists of three parts:

- **Inputs:** One or two assertions or negations which must already have ◆ or ◆ on their spaces on the board.
- **Model Prediction:** The likelihood of an output state having a certain value, when the inputs have certain values. (This likelihood is obtained from companion app.)
- **Output:** An assertion or negation being guessed for an attribute state. The attribute may already have any number of ◆ but may not have any ◆ on its spaces.



Support

Each model prediction has a **support** value displayed in the companion app. Support determines what type of argument you can make with the model, as well as how to settle disagreements at the end of the game. Support does not affect how many AP an argument is worth.

Two Types of Arguments

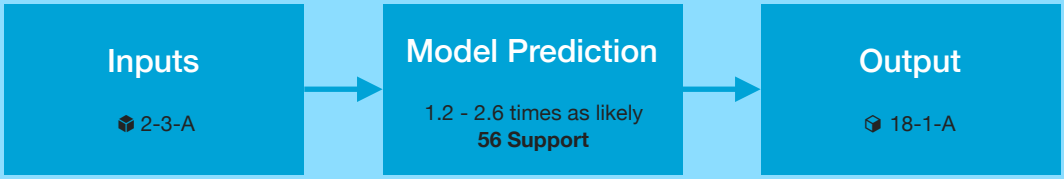
- **Conjectures** are arguments that predict attribute states in order to add ◆ to the board. Their predictions must have a **support value greater than 0**, and they may use one or two inputs.

- **Nullifications** are arguments against specific conjectures. They may invalidate those conjectures at the end of the game. Their inputs must have a **support value equal to 0**, and they must use two inputs. To nullify a conjecture:

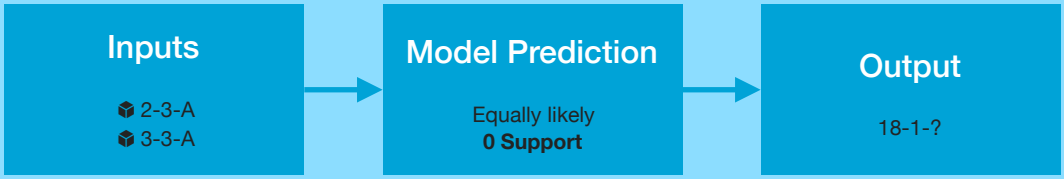
  - The targeted conjecture and the nullification must use **the same output state** (though they won't predict the same assertion or negation for it).
  - The **targeted conjecture must use only a single input**.
  - **One of the nullification's inputs must match the one used by the targeted conjecture** (both its state an assertion/negation status).

Example

A specimen has large canines (2-3-A) and molars (3-3-A). One player conjectures that it is a predator (18-1-A) because it has large canines (support 56).



*The other player could nullify this conjecture by creating an argument showing that predation cannot be predicted when an animal has both large canines **and** molars (support 0). The nullification demonstrates that large canines are not a good predictor of predation when an animal is **also** known to have molars.*



Creating Arguments

1. Crete an argument card as described in the app and place it above the game board in the column for its output attribute. (A particular argument may only be created once per game, unless both players happen to create it at the same time.)
2. If the argument is a **conjecture**, its creator **places 1** 👍 in the output's space and adds a 📦 if it does not have a 📦 already.
3. The argument's creator must **remove all of his or her** 👍 from assertion and negation spaces that are **incompatible with the new argument's output**.
4. The argument's creator receives **1** AP, plus **1** AP **per conjectured state used as an input** (i.e. states with 📦). If a special request card is active for the output's attribute, the creator receives twice the amount of AP earned in this way.

Invalid Arguments

Discoveries and nullification can sometimes cause arguments to become invalid. When this happens:

1. Turn the argument's card face down and move it away from the board.
2. If the argument is a **conjecture** and no remaining valid arguments share the same output space, remove the 📦 for its space from the game board.