

# THE SEARCH FOR PLANET X

RULEBOOK

*You can also learn to play by  
watching a video explanation:*

[SearchForPlanetX.com](http://SearchForPlanetX.com)

# AT THE EDGE OF OUR SOLAR SYSTEM...

*...a dark planet may lurk. In this competitive logic game, players take on the role of astronomers, surveying the night sky and attempting to deduce the location of this hidden planet.*

*Do you have what it takes to find Planet X?*

## Goal of the Game

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Earn renown by locating Planet X and by submitting correct theories about the locations of other objects in the solar system. The player who contributes the most to this astronomical investigation will score the most points and win the game!

**Inside the Science:** *In January 2016, Konstantin Batygin and Michael E. Brown published their “Planet Nine” hypothesis, using a computer model to show that a distant planet could explain the unique orbits of observable objects in the solar system.*



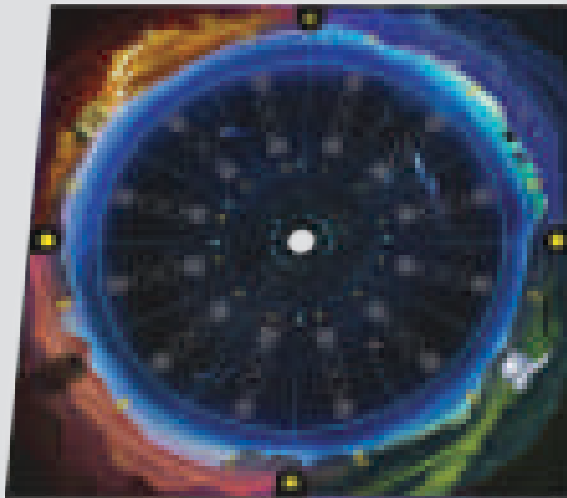
# Game Modes

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The game has two modes: Standard Mode and Expert Mode. In Expert Mode, the solar system has more sectors and the game is more challenging overall. The differences between the two modes are noted throughout this rulebook.

# Components

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1 SOLAR SYSTEM BOARD  
(DOUBLE-SIDED)



1 EARTH BOARD



1 WOODEN  
SUN DISC



48 THEORY TOKENS  
(12 PER PLAYER)



4 PLAYER SCREENS



8 TARGET TOKENS  
(2 PER PLAYER)



4 PLAYER  
PAWNS



1 PAD OF NOTE SHEETS  
(DOUBLE-SIDED)



4 EXPERT PANELS

**Important!** In addition to the components provided, you will need pencils and one or more electronic devices with the companion app. Visit [www.PlanetXApp.com](http://www.PlanetXApp.com) to download the app.

# PRINCIPLES OF ASTRONOMY

Each time you play, the companion app randomly determines the locations of different objects in the solar system, following predefined logic rules.

## Sectors

The solar system is divided into sectors, which are individually numbered and arranged in numerical order. The total number of sectors varies by mode: Standard Mode (12 sectors) or Expert Mode (18 sectors). Each sector either contains one object -OR- is truly empty.

## Objects

There are five types of objects: asteroids, comets, dwarf planets, gas clouds, and Planet X itself. Each type of object has certain logic rules that dictate where objects of that type can be located in relation to other objects or sectors.



### COMETS = 2 TOTAL

Each comet is located in one of these particular sectors, as indicated on your note sheet:

Standard Mode: 2, 3, 5, 7, or 11

Expert Mode: 2, 3, 5, 7, 11, 13, or 17

### ASTEROIDS = 4 TOTAL

Each asteroid is adjacent to at least one other asteroid. (This means that the asteroids are either in two separate pairs or in one group of four.)

### GAS CLOUDS = 2 TOTAL

Each gas cloud is adjacent to at least one truly empty sector.

### TRULY EMPTY SECTORS = 2 TOTAL \*

\* In Expert Mode, there are 5 truly empty sectors instead of 2.

### DWARF PLANETS = 1 TOTAL \*

No dwarf planet is adjacent to Planet X.

\* In Expert Mode, there are 4 dwarf planets total instead of 1. They are in a band of exactly 6 sectors, with a dwarf planet at each end.

### PLANET X = 1 TOTAL

Planet X is not adjacent to a dwarf planet.

In surveys and targets, the sector containing Planet X appears empty.



There is a distinction between sectors that *appear* empty and sectors that are *truly* empty. The sector containing Planet X appears empty in surveys and targets, but of course it isn't truly empty; it contains Planet X!

## Solar System

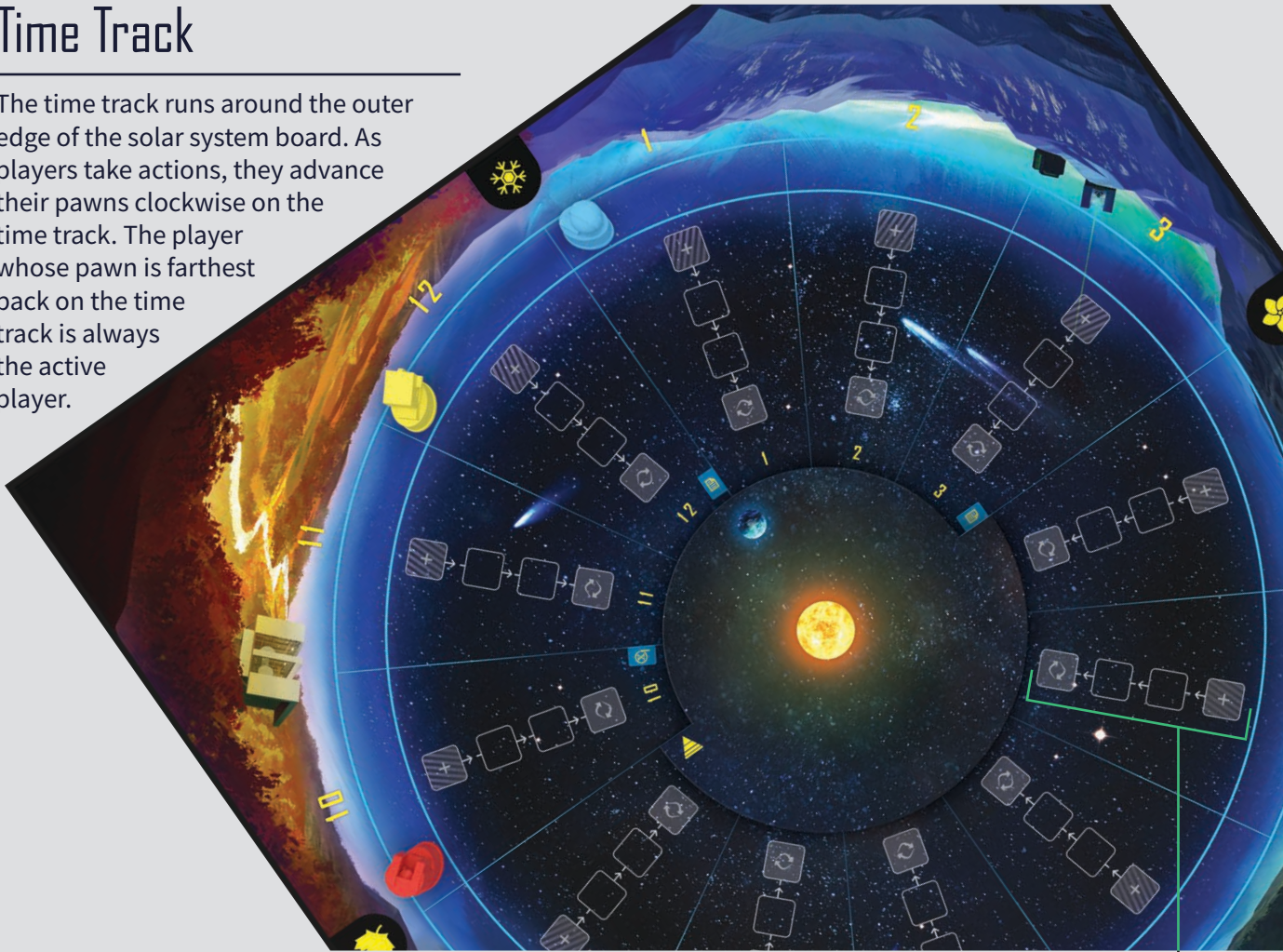
The solar system is made up of the solar system board and the earth board. The earth board rotates clockwise on its axis to represent the motion of Earth as it orbits the sun. On one half of the earth board, a portion is cut away so that the sector numbers are visible.

## Visible Sky

The visible sky is the range of sectors whose numbers are visible on the inner ring of the solar system board at any given time. The visible sky is always exactly half of the total sectors in the solar system. As the earth board rotates, the visible sky changes.

## Time Track

The time track runs around the outer edge of the solar system board. As players take actions, they advance their pawns clockwise on the time track. The player whose pawn is farthest back on the time track is always the active player.



## Theories

Players can submit theories about which object they think is located in a certain sector. Submitted theories are peer reviewed later and either proven to be correct or incorrect. At the end of the game, players score points for their correct theories.

## Peer Review Tracks

Each sector has its own peer review track, made up of four spaces connected by arrows. When a theory is submitted, it is placed on the outer space [+], then is moved inward until it reaches the inner space [🔄], at which point it undergoes peer review.



# GAME SETUP

## Choose Game Mode

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1. You must first choose a game mode: Standard Mode or Expert Mode. We recommend that you choose Standard Mode the first time you play, then move to Expert Mode once all players are familiar with the game. (But if the players have some experience with deduction games or logic puzzles, you should feel free to start with Expert Mode.)

## Board Setup

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2. Place the **solar system board** in the center of the table. Make sure that you are using the side of the board which corresponds to the chosen game mode. Orient the board so that each player is viewing it from one side indicated by a unique icon: spring equinox, summer solstice, autumn equinox, or winter solstice.
3. Place the **sun disc** so that it sits in the hole in the center of the solar system board.
4. Place the **earth board** on top of the solar system board with the sun disc in its center hole. Rotate the earth board so that the visible sky starts with sector 1.
5. Each player chooses a color. Find the **player pawns** matching the players' chosen player colors. Place all of these pawns in sector 1 of the time track, lined up in random order.

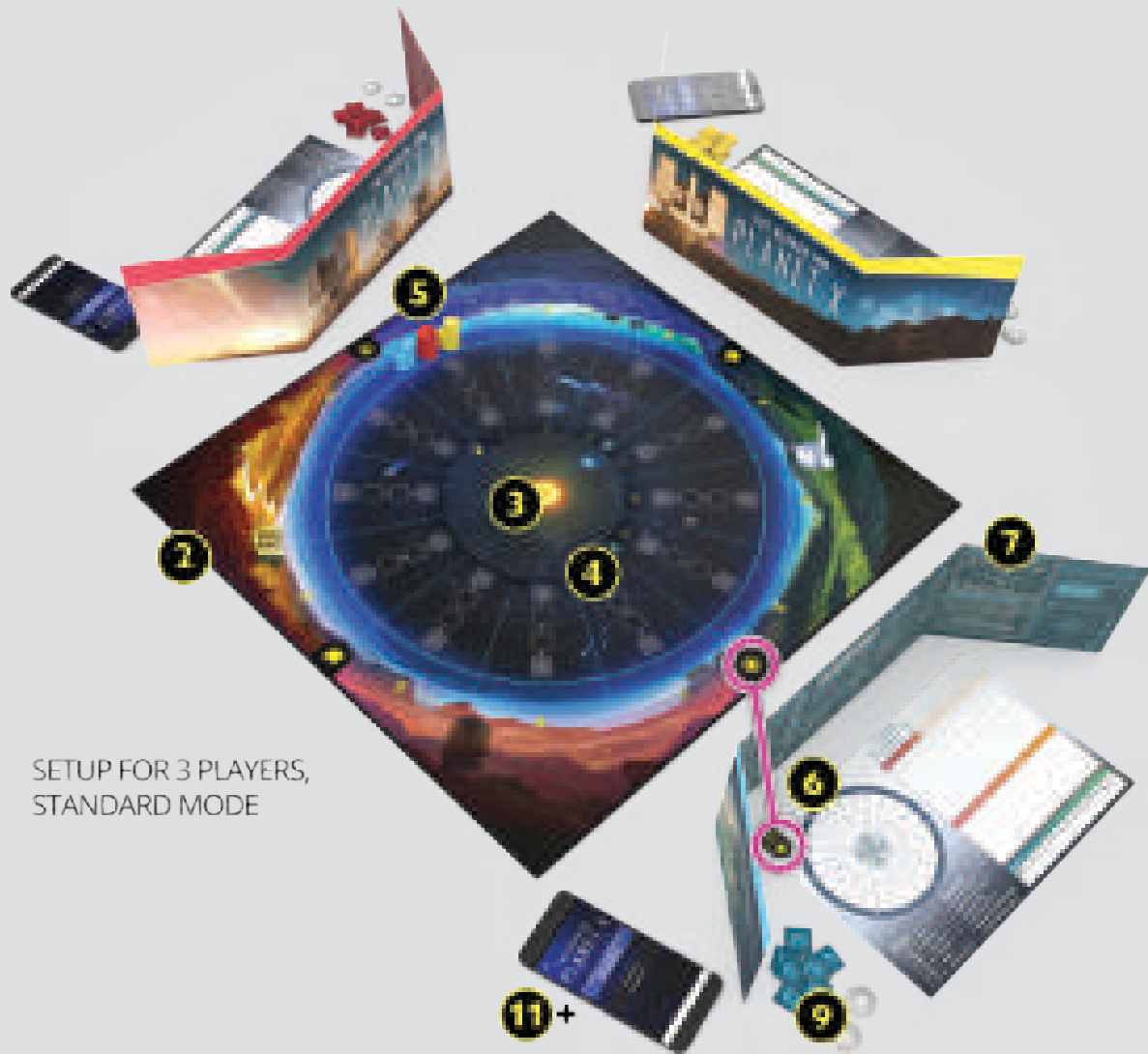
## Player Setup

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6. Give each player a **pencil** and a different **note sheet** with the icon matching their view of the solar system board. Also, make sure that all players are using the sides of their note sheets which correspond to the chosen game mode.
7. Give each player a **player screen** matching their chosen player color. Each player positions their player screen so that it hides their note sheet.
8. In Expert Mode, give each player the **expert panel** matching their player screen. Each player slides their panel into the slots in their screen. (In Standard Mode, do not use these expert panels. Return them to the game box.)
9. Give each player two **target tokens** and the 12 **theory tokens** which match their chosen player color. Each player puts their tokens behind their player screen.
10. In Standard Mode, each player uses only one of their dwarf planet theory tokens. Each player returns three dwarf planet tokens to the game box. (In Expert Mode, each player uses all four of their dwarf planet theory tokens.)



**Solo Mode.** For a 1-player game, complete only Steps 1-11 (skipping steps 12-16). Press the “Start Solo Game” button from the app’s initial screen for additional setup and rules.



SETUP FOR 3 PLAYERS,  
STANDARD MODE

## App Setup

Each player needs to have access to the companion app on an electronic device. Each player can use their own device –OR– share a device with one or more other players.

11. Install and launch the **companion app** on all devices that will be used during the game. To install the app on a device, visit <www.PlanetXApp.com> from the device.
12. On one device, generate a **game code**. To do this, press the “Start New Game” button from the app’s initial screen. Then press the button that matches the chosen game mode. Then press the “Start Game” button.
13. On each other device, press “Enter Game Code” from the app’s initial screen. Enter the game code generated by the first device and then press the “Join Game” button.

14. Verify that all devices are **displaying the same game code**. Then press the “Continue” button.

15. Each player will receive a certain amount of **starting information**, based on which experience level they choose. Each player should follow the instructions in the app to receive their starting information and record it on their note sheet.

\* If you have not played the game before, we recommend the “Beginner” level.

\* If you have played the game before, you may wish to try the “Experienced” or “Genius” level for a tougher challenge!

16. Once all players have recorded their starting information, press the “Start Game” button on all devices. You are now ready to begin!

# GAMEPLAY

## Gameplay Sequence

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Gameplay in *The Search for Planet X* does not proceed in a fixed turn order. Instead, turn order depends on the positions of the player pawns on the time track.

The player whose pawn is farthest back on the time track is the active player. On the active player's turn, they take one action, then advance their

pawn based on the time cost (⌚) of the action, usually moving it past other pawns as they do so.

Once the active player's turn is over, the player whose pawn is now farthest back on the time track becomes the new active player. Players continue taking turns until one player correctly locates Planet X.

## Turn Overview

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When you are the active player, carry out the following three steps, in order:

1. **Take One Action** – Choose one of the four available actions.
2. **Advance Your Player Pawn** – Move your pawn based on the time cost of the action.
3. **Rotate the Earth Board** – Rotate the earth board clockwise (if necessary).

→ **Conference Phase** – If the earth board reaches a conference icon as it rotates, pause the game to perform a conference phase.



→ **Theory Phase** – If the earth board reaches a theory icon as it rotates, pause the game to perform a theory phase.



## 1. Take One Action

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In this step, choose one of the four available actions:

- **Survey for an Object** – Select a type of object and a range of consecutive sectors in the visible sky. The app will reveal how many objects of that type are located in that range.
- **Target a Sector** – Select one sector in the visible sky. The app will reveal which object is located in that sector –OR– that the sector appears empty.
- **Research a Topic** – Select one of the available research topics. The app will reveal the information for that topic, a logic rule that applies in this particular game.

- **Locate Planet X** – Select the sector that you believe contains Planet X -AND- the objects you believe are located in the two adjacent sectors. The app will reveal whether you are correct or incorrect.



**Note.** Each action requires you to interact with the app. On your note sheet, record the information revealed by the app, along with any deductions you can make from that information. (See page 11 for examples on how to use the note sheet.)



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## SURVEY FOR AN OBJECT

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*One particular type of object has drawn your interest. Survey a range of visible sectors to find out how many objects of that type are located in that range.*

From the game menu screen within the app, press the “Survey” button. Select a type of object, then select a range of consecutive sectors in the visible sky. Announce your selections to the other players.

The app will now reveal how many objects of that type are located in that range. This is private information; record it on your note sheet, but do not announce it to the other players.

The time cost of this action varies based on the size of the selected range:

- Surveys of 1, 2, or 3 sectors cost 4 ☹.
- Surveys of 4, 5, or 6 sectors cost 3 ☹.
- Surveys of 7, 8, or 9 sectors cost 2 ☹.\*



**Note.** Most surveys will span multiple sectors, but a survey can start and end in the same sector to span a range of 1 sector. (Consider using the Target action instead.)



**Note.** When you survey for comets, the range must start and end with one of the sectors that can contain a comet.



**Important!** Remember that the sector containing Planet X appears empty in surveys. If you survey for empty sectors, the sector containing Planet X may be included in the count.

\* **Expert Mode only.** The visible sky in Standard Mode is only six sectors wide.

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## TARGET A SECTOR

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*Your search has led you to a particular sector that you feel holds key information. Target that sector when it is visible to discover which object it contains.*

When you take this action, you must spend one of your two target tokens. Once you have spent both of your target tokens, you cannot take this action again for the rest of the game.

From the game menu screen within the app, press the “Target” button. Select one sector in the visible sky. Announce your selection to the other players.

The app will now reveal which object is located in that sector –OR– that the sector appears empty. This is private information; record it on your note sheet, but do not announce it to the other players.

The time cost of this action is 4 ☹.



**Important!** Remember that the sector containing Planet X appears empty in surveys and targets. If the sector you targeted *appears* empty, that sector could be *truly* empty or it could contain Planet X.

**Inside the Science:** Some recently discovered objects, like the possible dwarf planets Sedna (2003) and 2012 VP113, have highly elliptical orbits with their closest points to the Sun clustered together. The Planet Nine hypothesis seeks to explain these unique orbits.

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## RESEARCH A TOPIC

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*Other advancements in the field might be able to assist you in your efforts. Review this research to learn about the relationships between certain objects.*

From the game menu screen within the app, press the “Research” button. On the next screen, select one of the available research topics, based on the types of objects listed in the topic. Announce your selection to the other players.

The app will then reveal the information for that research topic. This will be a logic rule that applies in this particular game. This is private information;

record it in the designated space on your note sheet, but do not announce it to the other players.

The time cost of this action is 1 ☹.



**Restriction.** You cannot take the Research action twice in a row. If you research on one turn, you must choose a different action on your next turn.



**Note.** Each research topic reveals only one piece of information. Once you research a specific topic, there is no reason for you to select that research topic again.

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## LOCATE PLANET X

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*This is it! All of your hard work may be about to pay off. Could this sector, which appears empty, really be the location of Planet X?*

From the game menu screen within the app, press the “Locate Planet X” button. Select which sector you think contains Planet X, then select which objects you think are located in the two adjacent sectors.

The app will now reveal whether or not you correctly located Planet X. Do not announce the sector where you looked, but do announce whether you succeeded or failed.

The time cost of this action is 5 ☹.



**To locate Planet X, you must know what sector it is in AND what is in the two adjacent sectors.**



**Important!** If you correctly located Planet X on your turn, you have triggered the end of the game. After advancing your pawn, skip directly to END OF THE GAME.

**Inside the Science:** The computer model behind the Planet Nine hypothesis predicted some objects would orbit the Sun perpendicular to the Earth’s orbit. Objects like those predictions had been discovered by other astronomers: 2012 DR30, 2013 BL76, etc.

When you determine that a sector does not contain a certain object, **cross out** the object icon in that sector.

When you determine the object located in a sector, **circle** the object icon in that sector (and cross out all others in that sector).

**Survey:** Record the object and range you surveyed and the resulting quantity.

**Target:** Record the sector you targeted and the resulting object.

**Research:** Record the topic you researched and the resulting information.

**THE SEARCH FOR PLANET X**

Sector	Result
A 1-6	B
D 4-8	F
Target B	B/F
Research B	A-D

Sector	Object
A 1-6	A
B 4-7	Planet X
C 7-11	C
Research B	Planet X
C 7-11	B

Topic	Information
A-D	At least 1 A is adj to D
A-B	
C-B	
D-C	
B-D	
A-D	X is not with B of D

**OBJECTS**

1	Planet X
2	Planet Y
3	Planet Z
4	Planet W
5	Planet V
6	Planet U
7	Planet T
8	Planet S
9	Planet R
10	Planet Q
11	Planet P
12	Planet O

**CONFERENCE**

1	Planet X
2	Planet Y
3	Planet Z
4	Planet W
5	Planet V
6	Planet U
7	Planet T
8	Planet S
9	Planet R
10	Planet Q
11	Planet P
12	Planet O

Some players find it useful to circle the  $\otimes$  and  $\square$  icons together to note that a sector appears empty.

Use a distinctive mark like a solid square to mark out starting information.

**Conference:** Record the revealed information on the line corresponding to the conference.

Use these columns if you want to record the actions your opponents have taken.



## 2. Advance Your Player Pawn

In this step, move your player pawn clockwise on the time track.

The number of sectors that your pawn advances is equal to the time cost of the action you chose this turn. The time costs for all possible actions are noted below, as well as on the player screens.

If your pawn ends its advance in a sector that already contains one or more other pawns, place

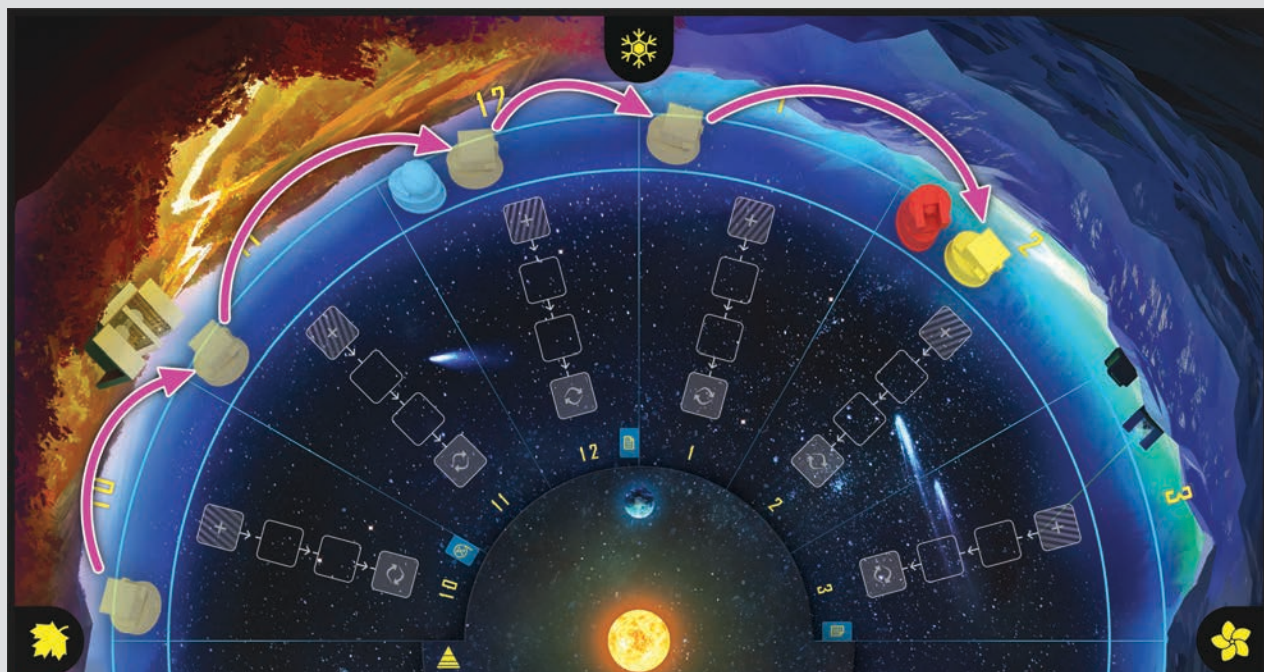
your pawn ahead of the other pawns, but still in the same sector. (This means that those players will take their next turns before you do.)



**Important!** If you correctly located Planet X on your turn, you have triggered the end of the game. After advancing your pawn, skip directly to END OF THE GAME.

ACTION	LOCATE PLANET X	TARGET A SECTOR	SURVEY FOR AN OBJECT			RESEARCH A TOPIC
			1, 2, OR 3 SECTORS	4, 5, OR 6 SECTORS	7, 8, OR 9 SECTORS	
TIME COST	5 ☉	4 ☉	4 ☉	3 ☉	2 ☉ *	1 ☉

\* **Expert Mode only.** The visible sky in Standard Mode is only six sectors wide.



**Example.** The yellow pawn is in sector 10 on the time track. The yellow player completes a Target action, costing 4 ☉. The yellow player advances their pawn 4 sectors on the time track to sector 2.

**Inside the Science:** If the Planet Nine hypothesis is correct, the planet would have a mass around 5 times that of Earth. It would take around 10,000 years to orbit the Sun, and it would currently be around 500 times farther from the Sun than the Earth is.

## 3. Rotate the Earth Board

In this step, check to see if the earth board needs to be rotated.

If the arrow on the earth board is not pointing directly at the sector which contains the pawn that is farthest back on the time track, rotate the earth board clockwise, one sector at a time.

As you rotate the earth board, if the arrow reaches

a sector with a conference icon or theory icon, pause the game to perform the associated phase.

Continue rotating the earth board clockwise, pausing the game to perform these phases as necessary, until the arrow reaches the sector which contains the pawn that is farthest back on the time track.



**Example.** The blue pawn is farthest back on the time track. Rotate the earth board clockwise toward that pawn. When the arrow reaches the conference icon, pause the game to perform the conference phase. Then continue rotating the earth board until it reaches sector 12. The blue player will then take the next turn.

### CONFERENCE PHASE

During this phase, all players receive a new piece of information about the location of Planet X.

Within the app, press the “Planet X Conference” button, then select the option which matches the current conference icon (either X1 or X2).

The app will now reveal the information for that conference. This will be a logic rule that applies in this particular game. Announce this information

to all players. Each player should record this information in the designated space on their note sheet. (See page 11.)

This phase is only performed the first time that the earth board reaches each conference icon. If it reaches the same conference icon again on its next rotation, there is no need to reveal the same conference information again.

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## THEORY PHASE

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*During this phase, there are two steps. In the first step, players can submit theories. In the second step, some theories might undergo peer review.*

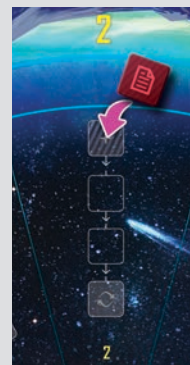
### 1. THEORY SUBMISSION

**A. Select Theories** – All players simultaneously select the theories they wish to submit. In Standard Mode, each player may select up to 1 theory; in Expert Mode, each player may select up to 2 theories. No matter how many theories they select, each player places their hand on the table outside their player screen, covering their selected theories so that no one else can see how many theories they selected.

**B. Place Theories** – Each player then places their selected theories face down in the outer space [ + ] of the peer review track in a sector they believe contains that type of object. This is done in player order (back to front), as indicated by the time track.

**Note:** You cannot place a theory in a sector if the object in that sector has already been confirmed by peer review. (See page 15.)

**C. Advance Theories** – Move all face-down theories — both those just placed in this theory phase and those from previous theory phases — one space inward on the peer review tracks in their sectors.




### ADDITIONAL RULES & CLARIFICATIONS

- *Multiple players can submit theories in the same sector during the same theory phase. When this happens, those theories are stacked in the outer space. For scoring purposes, they are considered to have been submitted at the same time.*
- *Players can submit theories in any sector of the solar system, including sectors that are not currently in the visible sky, as long as the object in that sector has not yet been confirmed by peer review.*
- *Once a player has submitted a theory in a sector, they cannot move that theory to a different sector. If a player runs out of theories for objects of a certain type, they cannot submit any more theories for objects of that type.*
- *No player can submit two identical theories in the same sector, but a player can submit two different theories in the same sector, as long as they do not submit those two different theories at the same time.*
- *Players can pick up and secretly view their own submitted theories at any time, if they have forgotten which ones they submitted in which sectors, but they must put them back exactly where they were.*



## 2. PEER REVIEW

For each sector that now has at least one theory in the inner space [  ] of the peer review track, conduct a peer review. If this applies to multiple sectors, conduct a peer review for each of those sectors, one at a time, in numerical order.

- A. Reveal Theories** – Reveal any theories that are in the inner space of the peer review track in this sector, flipping them face up. Do not reveal any theories that are farther out on the peer review track in this sector yet.
- B. Review Theories** – Press the “Peer Review” button within the app. Select which sector is being reviewed and which object is shown on one of the theories being reviewed. Then press the “View Results” button.
- C. Resolve Theories** – The results screen will now reveal whether the theory is correct or incorrect. Announce this information to all players. Resolve the theory, based on whether it is correct or incorrect (see below).



**Example.** Two theories reach the inner space of the peer review track. Peer review confirms that sector 9 contains an asteroid, but it finds that sector 10 does not contain a dwarf planet.

### CORRECT THEORY

The object located in this sector is now confirmed. On their note sheet, each player can circle that object icon for this sector. Players may no longer place new theories in this sector.

Flip all theories that are farther out on the peer review track in this sector face up to see whether they are correct or incorrect.

Remove all incorrect theories from the game. The players who submitted them must each advance their pawn one sector on the time track as a penalty.

Leave all correct theories exactly where they were. The players who submitted them will score points at the end of the game.

### INCORRECT THEORY

The object located in this sector remains unconfirmed. On their note sheet, each player can cross out that object icon for this sector.

Do not reveal any theories that are farther out on the peer review track in this sector. They remain face down for now.

Remove the incorrect theory from the game. The player who submitted it must advance their pawn one sector on the time track as a penalty.

If multiple theories are in the inner space of the peer review track in this sector, repeat this peer review process for those theories.



**Note.** If multiple players receive a time penalty for an incorrect theory in the same sector at the same time, advance their pawns in player order (back to front) so that their position in turn order, relative to each other, does not change.

# END OF THE GAME

## Game-End Condition

The end of the game is triggered when one player correctly locates Planet X. The player who triggered the end of the game still advances their pawn based on the time cost of that action (5 Ⓞ), but does not rotate the earth board.



**Important!** The player who triggered the end of the game by correctly locating Planet X should not announce the correct location of Planet X to the other players.

## Final Scoring Opportunities

Once the end of the game has been triggered, no more turns are taken. However, each player whose pawn is at least one sector back from the pawn of the player who located Planet X gets one final opportunity to score points.

Based on how far back their pawn is from the pawn of the player who located Planet X, each player may

either submit theories or attempt to locate Planet X. These final opportunities occur in player order (back to front), as indicated by the time track.

(For scoring purposes, theories submitted during these final scoring opportunities are considered to have been submitted at the same time.)

### SUBMIT THEORIES

*If you are 1, 2, or 3 sectors back, you may submit one theory. If you are 4 or 5 sectors back, you may submit up to two theories.*

OR

### LOCATE PLANET X

*Follow the normal steps for this action.*

*If correct, you will score 2–10 points, based on how far back you are.*



**Important!** Players do not advance their pawns during these final scoring opportunities, no matter which option they choose. For final scoring purposes, the other players' pawns should remain where they were when Planet X was correctly located.

## Reveal Objects

After all final scoring opportunities have occurred, press the “Reveal Objects” button within the app. The contents of each sector will now be displayed on the screen. Announce these displayed results to all players.

Flip all remaining face-down theories on the peer review tracks for all sectors face up. Then check these theories against the displayed results. Remove all incorrect theories from the game, but leave all correct theories where they are.

# Final Scoring

Once the game has ended, tally up final scores. Each player tallies their own final score, recording their points in the score chart at the bottom of their note sheet.

Final Score							TOTAL
: 1	: 2	: 3	: 4	: 4	: 10	: 8	
3	4	3	4	0	8	22	

①      ②      ③

## 1. Leader Bonuses

Score 1 point for each sector where you were the first player (or tied for first) to submit the correct theory about the object in that sector.

## 2. Correct Theories

Score points for each correct theory you submitted, as indicated by the chart:

- **Asteroids** – Score 2 points each
- **Comets** – Score 3 points each
- **Gas Clouds** – Score 4 points each
- **Dwarf Planets** – Score 4 points (Standard Mode) or 2 points each (Expert Mode)

## 3. Locating Planet X

Score 10 points if you were the first player to correctly locate Planet X.

If you correctly located Planet X but were not the first player to do so, count how many sectors back your pawn is from the pawn of the player who did so first (i.e., 1–5 sectors). Score two points for each sector back (i.e., 2–10 points).

# WINNING THE GAME

Tally the final scores. The player who scored the most points has contributed the most to this astronomical investigation and is the winner!

- **If there is a tie...**  
The tied player who scored the most points for locating Planet X is the winner.
- **If there is still a tie...**  
The tied player who scored the most points for leader bonuses is the winner.
- **If there is still a tie...**  
The tied players rejoice in their shared victory.

**Inside the Science:** The LSST (Large Synoptic Survey Telescope) is currently under construction in Chile and scheduled to begin operations in 2022-2023. If the Planet Nine hypothesis is correct, the LSST has a high likelihood of finding the distant planet.



# IMPORTANT TERMS



**Important!** This section offers definitions of the spatial terms you will need to know in order to make deductions based on the information you receive during the game.

TERM	DEFINITION	EXAMPLE
<b>ADJACENT TO</b>	<p>When an object is said to be “adjacent to” another object, that means it is located one sector to the left or to the right of the sector containing the other object.</p> <p>For example, there are two sectors “adjacent to” sector 8: sectors 7 and 9.</p>	<p>Let’s say you know the dwarf planet is in sector 8. Then you research a topic that reveals, “At least one gas cloud is adjacent to the dwarf planet.” This means one of the gas clouds must be in either sector 7 or sector 9.</p>
<b>CONSECUTIVE SECTORS</b>	<p>When a number of objects of one type are said to be in “consecutive sectors,” that means they are in an unbroken group of sectors without any other objects between them.</p>	<p>You know there are asteroids in sectors 9 and 12. Then you research a topic that reveals, “All asteroids are in consecutive sectors.” This means the other asteroids must be in sectors 10 and 11.</p>
<b>DIRECTLY OPPOSITE</b>	<p>Each sector has one sector that is “directly opposite” it, the one sector halfway around the board or 180° away from it.</p> <p>For example, in Standard Mode, sector 4 is “directly opposite” sector 10.</p>	<p>In Standard Mode, let’s say you know the comets are in sectors 3 and 5. Then a conference reveals, “Planet X is not directly opposite a comet.” This means Planet X is not in sectors 9 or 11.</p>
<b>WITHIN N SECTORS</b>	<p>When an object is said to be “within N sectors” of another object, that means it could be in any of the sectors up to that number of sectors away from the other object.</p> <p>For example, there are four sectors “within 2 sectors” of sector 5: sectors 3, 4, 6, and 7.</p>	<p>Let’s say you know the comets are in sectors 5 and 7. Then you research a topic that reveals, “The dwarf planet is within two sectors of a comet.” This means the dwarf planet must be in one of these sectors: 3, 4, 6, 8, or 9.</p>
<b>IN A BAND OF N SECTORS OR LESS</b>	<p>A band is an unbroken group of consecutive sectors. When objects are said to be “in a band” of a certain size or less, it means the number of consecutive sectors that contains them is that number or fewer.</p> <p>For example, sectors 7, 8, 9, and 10 make up a “band of 4 sectors.”</p>	<p>Let’s say you know two asteroids are in sectors 5 and 6. Then you research a topic that reveals, “All asteroids are in a band of 5 sectors or less.” This means the other two asteroids must be in one of these ranges: 2-3, 3-4, 4-7, 7-8, or 8-9.</p>

# CREDITS

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*Inside the Science:* For more information about the science behind the game, as well as new discoveries and other updates related to this investigation, visit our website:  
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AT THE EDGE OF OUR SOLAR SYSTEM, A DARK PLANET MAY LURK. SINCE THE TURN OF THE CENTURY, ASTRONOMERS HAVE BEEN DISCOVERING DISTANT OBJECTS AND TRACKING THEIR ORBITS TO BETTER UNDERSTAND THE SOLAR SYSTEM. SOME BELIEVE THE EVIDENCE POINTS TO THE EXISTENCE OF A DISTANT, UNDISCOVERED PLANET. DO YOU HAVE WHAT IT TAKES TO FIND PLANET X?

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