# Observatory Night Chart

## HOST ONLY - preparation and story

**Includes answers. Keep these pages and all hint pages with the adult host.**

Welcome to the observatory garden. Observers must choose a quiet garden shelter using the night chart and field records. Your team has the original records on the table. First recover five pieces of information, then use the final plan to design the observatory moth shelter. Keep every result beside its badge so another teammate can check your reasoning.

1. Print the six player sheets and two record sheets for each team. Keep answers and hints with the host.

2. Lay out Fictional food-web rules, Fictional field cards, the remaining clue sheets and the final plan. All task records are printed inside the sheets; no extra prop is needed.

3. After each clue, pass roles one seat clockwise. With two players, combine Reader with Recorder and Checker with Builder. With five or six, add a second checker and a source finder; everyone explains one decision.

4 players; 1 team. Give each team 6 player sheets and 2 record sheets. Share one host guide and one set of three hint levels.

Paper and pencils are enough. Keep whole sheets at one table; nothing needs cutting, folding or hiding.

Optional: 4 invitations or certificates, only if selected.

# Observatory Night Chart

## HOST ONLY - solution guide

### 1. Food: MOTH

Propagate food availability from the printed starting food. The OR visitor has a supported food chain; the AND visitor lacks one food and the circular pair never gets started. Result: MOTH.

### 2. Habitat: REED

Compare feature values across all field cards. Apply positive and negative requirements together; only one complete feature set remains. Result: REED.

### 3. Keeper: 9

Vega has Scope; Rigel has Pen; Deneb has Chart. Rigel's item gives 9. Result: 9.

### 4. Read: 2

The only order is Open roof > Set scope > Read chart > Record sky. Position 4 carries 2. Result: 2.

### 5. Point: 9

The route ends at row 3, column 4. That cell gives 9. Result: 9.

### 6. Final: R2-F1-W2-D1-E2

Each recovered field result sets one separate habitat requirement. Match all five layers; a complete plan must include suitable cover, ground, water, food and access. Checked result: R2-F1-W2-D1-E2.

# Observatory Night Chart

## HOST ONLY - timeline, story and ending

3 minutes: Read the opening. Show the evidence record and choose starting roles.

5 minutes: Solve Food. Offer one hint at a time and rotate roles after checking.

5 minutes: Solve Habitat. Offer one hint at a time and rotate roles after checking.

5 minutes: Solve Keeper. Offer one hint at a time and rotate roles after checking.

5 minutes: Solve Read. Offer one hint at a time and rotate roles after checking.

5 minutes: Solve Point. Offer one hint at a time and rotate roles after checking.

7 minutes: Build the five-part habitat design using all five results.

3 minutes: Read the ending. Ask each teammate to explain one rejected alternative.

After Habitat: A suitable roof does not guarantee suitable food or water. Keep each habitat need beside its field evidence. Pass the record sheet to a new checker before opening the next clue.

After Read: Four results are recorded. Each teammate points to a source supporting one result. Complete the fifth check before building the five-part habitat design.

Check every result using the solution guide. Offer the next hint only when requested; save the answer reveal until the group is ready.

**The paper model uses parts R2-F1-W2-D1-E2, with every habitat layer matched to its evidence. Thank each teammate for a different piece of reasoning.**

Explain one tempting wrong choice and the evidence that ruled it out. Show how each of the five results affected the five-part habitat design. If a clue is missing, say what remains uncertain before reopening that sheet.

Duration and ages are estimates. Adjust the pace and offer help for your group.

# Observatory Night Chart

## Player clue 1: Food | Team 1

Observers must choose a quiet garden shelter using the night chart and field records. We will use the records on the table to design the observatory moth shelter. Share the reading, explain each choice and keep the five results for the final plan.

Use only the fictional food-web rules printed here. Start with the food available now. A creature becomes available when its food rule is met. Find which named visitor can live here; a loop cannot create its own first food.

**Fictional food-web rules**

NIB needs LEAF

PEEP needs SEED

MOTH needs NIB OR PEEP

GLIM needs NIB AND PEEP

LOOP needs TWIN

TWIN needs LOOP

**Starting conditions**

Available now: SEED.

A result becomes available when its needs are met.

Which of MOTH, GLIM, LOOP becomes available?

Food result: _____

# Observatory Night Chart

## Player clue 2: Habitat | Team 1

These are fictional field cards for a paper model. Compare all the recorded conditions with the habitat requirements. A card that passes only one rule is not enough. Report the one card that meets every rule.

**Fictional field cards**

FERN: light=shade; floor=dry; entry=wide

MOSS: light=sun; floor=damp; entry=narrow

REED: light=shade; floor=damp; entry=wide

**Required features**

light must be shade.

floor must be damp.

Report the one matching card ID.

Habitat result: _____

# Observatory Night Chart

## Player clue 3: Keeper | Team 1

Keeper desk: Each person has ONE different item. Use all four NOT rules. Find Rigel's item and copy its digit.

| | | |
|---|---|---|
| **Scope**<br>digit 3 | **Chart**<br>digit 6 | **Pen**<br>digit 9 |

**People: Vega, Rigel, Deneb**

Vega does NOT have Pen.

Rigel does NOT have Scope.

Rigel does NOT have Chart.

Deneb does NOT have Scope.

**Find Rigel's item. Each item is used once.**

Keeper result: _____

# Observatory Night Chart

## Player clue 4: Read | Team 1

Read desk: Combine every BEFORE rule to order the four actions. Write positions on the whole-sheet cards. Read position 4.

| | |
|---|---|
| **Set scope [8]** | **Record sky [2]** |
| **Read chart [0]** | **Open roof [6]** |

Open roof BEFORE Read chart

Set scope BEFORE Record sky

Read chart BEFORE Record sky

Open roof BEFORE Set scope

Set scope BEFORE Read chart

**Read position 4 (positions start at 1).**

Read result: _____

# Observatory Night Chart

## Player clue 5: Point | Team 1

Point desk: Start at S. Follow EVERY arrow one square, including revisited cells. Record only the endpoint digit.

| | | | |
|---|---|---|---|
| **S: 7** | **9** | **1** | **3** |
| **0** | **2** | **4** | **6** |
| **3** | **5** | **7** | **9** |

**right > down > right > up > right > down > down**

One arrow = one square. S = start.

Point result: _____

# Observatory Night Chart

## Player clue 6: Final | Team 1

Recover one requirement for each habitat layer from its named result. Choose a matching roof, floor, water source, food and entry. Write the five part IDs in the printed layer order, then point to the evidence supporting each choice.

Use your results from: Food, Habitat, Keeper, Read, Point.

**Habitat construction key**
Roof (Food): GLIM=shade; MOTH=sun
Floor (Habitat): REED=dry; FERN=damp
Water (Keeper): 3=still; 9=flow
Food (Read): 2=leaf; 8=seed
Entry (Point): 7=wide; 9=narrow
**Parts (one per layer, top to bottom)**
Roof: R2=sun; R1=shade
Floor: F1=dry; F2=damp
Water: W2=flow; W1=still
Food: D1=leaf; D2=seed
Entry: E2=narrow; E1=wide
**Build rule**
Choose each part meeting its recovered requirement.
Report five part IDs top to bottom, with hyphens.

Final result: _____

Ask your host to check your final result and read the ending.

# Observatory Night Chart

## Hint level 1 - HOST ONLY

### 1. Food

Start with the available-food line, not with the visitor names.

### 2. Habitat

Place a finger on the same feature in each field card.

### 3. Keeper

Find the three people, the three items and the forbidden pairings.

### 4. Read

Find all the event cards and the before notes.

### 5. Point

Find the starting square and read the full move list.

### 6. Final

Keep the five named results beside the final plan and find the key for each badge.

# Observatory Night Chart

## Hint level 2 - HOST ONLY

### 1. Food

AND needs both foods. OR needs either food. A circular pair still needs an outside starting food.

### 2. Habitat

A "must not" rule removes a match; it does not ask you to look for that feature.

### 3. Keeper

Each item is used once. A person ruled out of two items must have the third.

### 4. Read

Connect cards linked by the notes; a card position is counted from the beginning of the completed order.

### 5. Point

Each move changes just one square. Keep track of row and column after each move.

### 6. Final

Each badge controls a different fact, road leg, order note, pulse or habitat layer. Use the matching key exactly once.

# Observatory Night Chart

## Hint level 3 - HOST ONLY

### 1. Food

Mark each creature whose food is already available; repeat until no new creature can be marked. Then compare only the listed visitors.

### 2. Habitat

Test every remaining card against all requirements. Explain the particular requirement each rejected card fails.

### 3. Keeper

Place the most restricted person, remove that item from the others, then use the remaining rule. Read the target person only after checking all pairs.

### 4. Read

Check every before relationship, then read only the requested position. The printed card arrangement is not the answer order.

### 5. Point

Trace the moves one at a time, then retrace them to check the final square before recording its value.

### 6. Final

Check the completed product against all five recovered facts. If two answers remain, locate the fact that distinguishes them rather than guessing.

# Observatory Night Chart

## Team 1 result record

Write the complete result from each clue. Results can be words, routes, orders, settings or numbers.

Food: _____

Habitat: _____

Keeper: _____

Read: _____

Point: _____

Keep this record beside the final clue. Copy results exactly, including any leading zero.

Reader / Recorder / Evidence checker / Route or model builder

After each clue, pass roles one seat clockwise. With two players, combine Reader with Recorder and Checker with Builder. With five or six, add a second checker and a source finder; everyone explains one decision.

# Observatory Night Chart

## Team 1 final result and celebration

## Our final challenge: Final

We combined our earlier clues to decide:

_____

_____

We know it works because:

_____

_____

Host: compare the result with your solution guide. Read the ending when it matches, then let the team explain one discovery.

No physical lock or prize is required. Draw a celebration star here if you like.

# Observatory Night Chart

**You're invited to a mystery!**

## Join Birthday Explorer for Observatory Night Chart.

Observers must choose a quiet garden shelter using the night chart and field records. Work together to design the observatory moth shelter.

Date: _____

Time: _____

Place: _____

Bring your curiosity. Paper and pencils are provided. Share ideas and solve six clues together.

Designed for ages 8-10. Estimated 35-50 minutes.

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## Mystery Explorer

Presented to Birthday Explorer

Team member: _____

For completing Observatory Night Chart with curiosity, teamwork and kindness.

The paper model uses parts R2-F1-W2-D1-E2, with every habitat layer matched to its evidence. Thank each teammate for a different piece of reasoning.

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Host signature: _____

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