Relay Station Echo

HOST ONLY - preparation and story

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

Welcome to the relay station. A receiver repeats its inputs; the crew must distinguish the signal order from an unordered training key. Your team has the original records on the table. First recover five pieces of information, then use the final plan to set the echo receiver. 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 Unlabelled legend, Relay log, 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.

Relay Station Echo

HOST ONLY - solution guide

1. Signal: SEND-WAIT

A consistent one-to-one mapping satisfies every training example. Use the complete mapping to read the two-signal message in order. Result: SEND-WAIT.

2. Record: TWINE

Check source status first, then join the matching tag. The useful information comes from separate records, not their printed row order. Result: TWINE.

3. Window: CLEAR

Add job time and travel time to each printed start. Compare the sum with both that window's end and the deadline, then reject early starts. Result: CLEAR.

4. Kit: C-D

Compare coverage before weight. Only complete kits qualify; minimize their combined weight and report the selected cards in alphabetical order. Result: C-D.

5. Food: ECHO

Start with listed stock. Follow the printed dependencies until no new component becomes available; a circular dependency cannot create its first input. Result: ECHO.

6. Final: A2-B0-C2-D1-E1

Select one pulse card for each of the five badge results. Add the turns by dial column to the printed starting states and wrap each total around 0, 1, 2. The checked configuration is A2-B0-C2-D1-E1; each pulse pair has equal size and total turns, so its shape does not identify the correct choice.

Relay Station Echo

HOST ONLY - timeline, story and ending

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

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

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

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

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

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

7 minutes: Build the checked five-dial configuration using all five results.

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

After Record: Several recovered pulses may affect the same dial. Keep the legend and the starting positions visible. Pass the record sheet to a new checker before opening the next clue.

After Kit: Four results are recorded. Each teammate points to a source supporting one result. Complete the fifth check before building the checked five-dial configuration.

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

The panel is ready at A2-B0-C2-D1-E1; every recorded pulse has been applied. 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 checked five-dial configuration. 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.

Relay Station Echo

Player clue 1: Signal | Team 1

A receiver repeats its inputs; the crew must distinguish the signal order from an unordered training key. We will use the records on the table to set the echo receiver. Share the reading, explain each choice and keep the five results for the final plan.

Each signal means one different word. Use the training examples to recover the legend. These examples keep their order. Decode the received message from left to right. The desk uses this message when handling the echo receiver.

Unlabelled legend

Signals: DOT, BAR, ARC. Words: WAIT, SEND, TURN.

Each signal has one word; each word is used once.

Training messages

ARC+DOT means TURN+SEND

BAR+ARC means WAIT+TURN

Received message

DOT > BAR

Report decoded words in order, with hyphens.

Signal result: _____

Relay Station Echo

Player clue 2: Record | Team 1

Ignore cancelled and draft relay records. Match the remaining tag to a bay, then match that bay to the line card. Report the line material rather than the first bay name you find.

Relay log
item: Mast | tag: PINE | status: cancelled
item: Wire | tag: WAVE | status: draft
item: Dish | tag: STAR | status: checked
Cable book
tag: STAR | bay: NORTH
tag: PINE | bay: EAST
tag: WAVE | bay: WEST
Relay line cards
bay: EAST | line: COPPER
bay: WEST | line: FIBRE
bay: NORTH | line: TWINE
Cross-check
Match A.tag to B.tag.
Match B.bay to C.bay.
A.status is not cancelled.
A.status is not draft.
Report C.line.

Record result: _____

Relay Station Echo

Player clue 3: Window | Team 1

A relay test and the trip to its receiver must fit one window. Reject starts before the bench opens, windows that end too soon and arrivals after the receiver deadline. Report the only usable window.

Departure windows (minutes after opening)

EARLY: start 3; window ends 25

BRIEF: start 16; window ends 20

CLEAR: start 20; window ends 36

LATE: start 31; window ends 55

Work and travel

Earliest start 10; job 8 min.

Travel 5 min; arrival deadline 40.

Job + travel must both fit inside one window.

Report the only possible window ID.

Window result: _____

Relay Station Echo

Player clue 4: Kit | Team 1

Pack a kit that supplies all three needs. One card may cover two needs, but its weight is counted once. Choose the lightest complete kit within the carrier limit. Report its card letters alphabetically.

Supply cards

A: weight 5; gives tie+light

B: weight 2; gives mark

C: weight 2; gives tie

D: weight 2; gives light+mark

E: weight 7; gives tie+light+mark

Packing order

Capacity 7; must cover tie, light, mark.

Use the lightest complete kit. Each card once.

Write chosen card IDs alphabetically, with hyphens.

Kit result: _____

Relay Station Echo

Player clue 5: Food | Team 1

The relay bench has the listed stock. Follow the dependency cards to find which test can run now. Both power and line must be ready when a card says AND.

Relay readiness cards

POWER needs CELL

LINE needs WIRE

ECHO needs POWER AND LINE

LAMP needs POWER AND BULB

BULB needs DELIVERY

Starting conditions

Available now: CELL, WIRE.

A result becomes available when its needs are met.

Which of ECHO, LAMP, BULB becomes available?

Food result: _____

Relay Station Echo

Player clue 6: Final | Team 1

Use the five results to select five pulse cards. Start at the recorded dial states. Add all selected turns for each dial and follow its loop: 0, 1, 2, then 0 again. Report the final state of dials A through E.

Use your results from: Signal, Record, Window, Kit, Food.

Control panel

Dial order: A, B, C, D, E. States: 0 > 1 > 2 (loop).

Start: A1 / B2 / C0 / D1 / E2.

Pulse cards (turns in dial order)

Signal: SEND-WAIT=(1,2,0,0,0); WAIT-SEND=(2,1,0,0,0)

Record: COPPER=(0,1,0,2,0); TWINE=(0,2,0,1,0)

Window: CLEAR=(0,0,2,1,0); EARLY=(0,0,1,2,0)

Kit: A-B=(1,0,0,2,0); C-D=(2,0,0,1,0)

Food: ECHO=(1,0,0,0,2); LAMP=(2,0,0,0,1)

Setting rule

Add every chosen pulse. Move around each dial loop.

Report dial ID + state, in order, with hyphens.

Final result: _____

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

Relay Station Echo

Hint level 1 - HOST ONLY

1. Signal

Look at the training cards that share one signal.

2. Record

Start with the status field in Relay log.

3. Window

Look at earliest start, each window end and the arrival deadline.

4. Kit

Read each supply card and the three required needs.

5. Food

Find the stock line and the readiness cards.

6. Final

Find the starting states, dial order and pulse-card key.

Relay Station Echo

Hint level 2 - HOST ONLY

1. Signal

In an unordered pair, a word cannot be assigned by its left/right position. Use the overlap with another pair.

2. Record

The tag links an item to a bay; rows in separate records need not line up.

3. Window

The journey uses time as well as the job; add both to the start of each window.

4. Kit

A light card alone may leave a need uncovered; a shared supply counts for both needs.

5. Food

AND needs every input; OR needs one. A future delivery is not current stock.

6. Final

Each selected vector lists turns for every dial. Several different cards can affect the same dial.

Relay Station Echo

Hint level 3 - HOST ONLY

1. Signal

Give each signal a different word, check every training example and only then decode the received message in its printed order.

2. Record

Keep only entries meeting every status test. Follow each printed join to the report field; do not guess from row position.

3. Window

Check all three conditions for each window. A slot can be long enough yet start too early or arrive too late.

4. Kit

Compare complete combinations, adding each chosen card weight once. Reject any combination over the limit before choosing the lightest.

5. Food

Mark supported components in rounds. Stop when no further component can be marked and compare the proposed results.

6. Final

Add one dial column at a time to its starting state, wrap around the three-state loop, then check that all five pulse cards were used.

Relay Station Echo

Team 1 result record

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

Signal: _____

Record: _____

Window: _____

Kit: _____

Food: _____

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.

Relay Station Echo

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.

Relay Station Echo

You're invited to a mystery!

Join Birthday Explorer for Relay Station Echo.

A receiver repeats its inputs; the crew must distinguish the signal order from an unordered training key. Work together to set the echo receiver.

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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Relay Station Echo

Mystery Explorer

Presented to Birthday Explorer

Team member: _____

For completing Relay Station Echo with curiosity, teamwork and kindness.

The panel is ready at A2-B0-C2-D1-E1; every recorded pulse has been applied. Thank each teammate for a different piece of reasoning.

Date: _____

Host signature: _____

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