

Explore the zipper with Quinn

Companion to *The Bag That Wouldn't Take One More Thing*, OBH-002, story version 1. Intended for discussion with middle and high school readers; the simpler route can support different experience levels. No activity duration or curriculum alignment has been tested or claimed.

What learners will explain

Ask the learner to explain how a moving slider guides separate rows into engagement, why the bounded metal-model chain can remain joined behind it, and why a clear but overfilled bag calls for a different choice than caught cloth. Listen for the relationship between guiding shape and working conditions, rather than exact terminology alone.

No earlier episode is required. Learners need only distinguish a moving part from a stationary one and follow “ahead of” and “behind” relative to a chosen direction. Supply those meanings by pointing to a drawing before asking for an explanation. The story introduces force and friction locally. The separate force lesson is an optional closer look after the story. Friction is explained here; no separate friction lesson is required.

Vocabulary at the moment it matters

- **Tape:** fabric strip carrying one row of elements.
- **Elements/teeth:** the repeated parts along the two tapes that engage and separate.
- **Slider body / pull tab:** the guiding body and the attached part the hand holds; they have different jobs.
- **Engagement:** elements fitting together. **Projection / recess:** a sticking-out part and a hollow receiving it in the particular metal model.
- **Force:** a push or pull. **Sliding friction:** contact resistance opposing relative sliding. It does not name every possible obstruction or failed fit.
- **Relative motion:** movement of one part compared with another. You can describe a slider moving along a chain or a chain passing through a fixed slider; keep arrows consistent with the chosen viewpoint.

Before giving away the answer

During “A tiny moving workshop,” pause after Quinn wonders what passage can join and divide the rows, before the manufacturer drawing. Ask: “What would the route need to let two rows do? What changes when the motion reverses?” Let the learner sketch or explain verbally. Accept a branching idea without requiring a perfect Y. If someone predicts a clamp, ask what holds the section the slider has already left. Continue reading even if no prediction is offered.

During “One more thing,” pause before Quinn removes the packet. Ask: “What evidence differs from the first stall? Which condition could he change before touching the tab again?” Avoid suggesting the contents until the learner has compared the lining, passage and spread edges.

Observation: ahead and behind

This is a proposed ordinary-item observation, not a tested repair activity.

Materials: one intact empty pencil case or spare garment with an attached zipper; a table; paper and pencil for optional recording. A magnifier is optional. An adult checks beforehand for smooth normal movement, sharp/damaged parts and loose small pieces. Choose a closed-end item to avoid separating-jacket startup becoming another task. No zipper should be removed from its item.

Preparation: read the story and identify the two rows, slider body and tab. Remove contents; lay the item flat. Check that lining and loose threads are clear. Choose a comfortable orientation and agree which movement opens and which closes. Do not assume upward always closes.

1. Without moving anything, describe or sketch which chain section is joined and which is separate. If the case is fully closed, an adult may open a small section normally first.
2. Predict where the state will change when the slider moves gently a short distance toward closing.
3. Move it normally and gently, keeping fingers and hair away from the moving passage. Stop immediately at resistance. Observe just ahead of and just behind the slider; keep fingers out of the passage.
4. Reverse gently and compare. Keep the same item, orientation and empty condition; the intended change is direction of relative movement.
5. Record what is visible and what is inferred from the schematic. Explain why the closed section can remain joined away from the slider in the metal model.

Expected range: learners may see joined versus separate rows readily while individual element shapes remain too small to resolve. A coil zipper may not resemble the metal detail. Record the actual visibility and construction rather than inventing a projection/recess observation. If motion resists or looks abnormal, stop using the item and use the diagram route below. That is a setup limit, not a learner failure.

Safety: never deliberately catch lining, add objects to the passage, overload a bag, pull the chain sides apart, remove stops or detach small components. Do not use blades, pliers, heat or lubricants. Exclude damaged/sharp items. Keep younger siblings away from loose small objects; the attached intact case or paper route avoids handing them detached zipper parts. An adult handles any item unsuitable for the learner; no physical operation is required to participate.

Limits: visible state changes support observation of joining/separation. They cannot expose an opaque slider's interior, measure forces/friction/strength, demonstrate an exact patent geometry or prove a repair works. The diagram explains hidden relationships as a model. Normal movement is not permission to test failure.

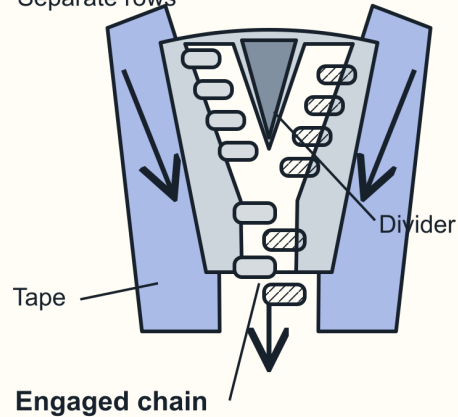
Paper or verbal route

One route, two directions

Slider shown fixed in both panels

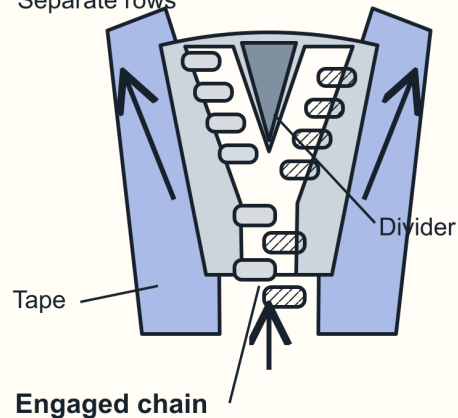
1 Closing

Elements travel relative to slider
Separate rows



2 Opening

Elements travel relative to slider
Separate rows



Hidden interior shown as a model.

Arrows do not show slider travel.

Schematic, not to scale.

A schematic cutaway compares closing and opening through the same Y-shaped passage. It explains a hidden route rather than showing an observed transparent slider.

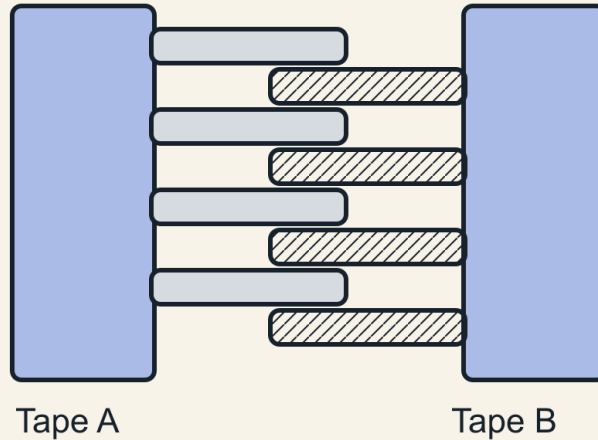
Diagram in words: Closing: separate rows travel through two branches into engagement at the single route.

Opening: the engaged chain travels the reverse way and divides into the branches. Both panels show elements moving relative to a fixed slider.

The fit left behind

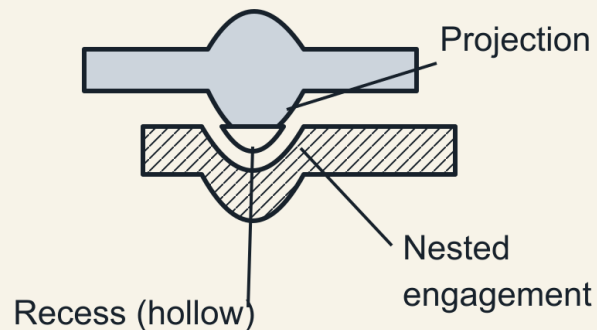
Metal design model · not to scale

1 Alternating elements



2 Enlarged side section

Projection fits a neighboring hollow.



Rounded, sufficiently close-fitting surfaces retain this model's join.

Exact shapes vary by construction.

This is not every zipper's geometry.

An enlarged metal model explains a fit that remains after the slider moves away. It is not the exact geometry of every zipper.

Diagram in words: Elements from opposite tapes alternate. A rounded projection fits into a neighboring recess in this enlarged metal-design model; exact element shapes differ across zipper constructions.

Use the story's closing/opening diagram or describe two branches meeting one route. The learner traces separate rows toward engagement for closing, then describes the reverse division for opening. Mark projection and recess on the bounded metal detail; identify them by label and outline, not color

alone. No cutting or small loose tokens are needed. For an entirely verbal route, have the learner describe where the rows are separate, where guidance happens and where the joined chain remains.

This preserves the central explanation without materials, technology or fine motor action. It is interpretation of an explanatory model, with less direct evidence than observing an actual intact item. The diagrams and their text equivalents accompany this activity.

Discussion and transfer

1. Quinn expected a squeezing slider to explain closure. What did the section behind the slider make him reconsider?
2. In the metal model, which feature performs guidance, and which feature retains engagement after guidance?
3. What changed and stayed constant when Quinn opened and closed the mostly empty bag?
4. An ordinary zippered pouch has no visible cloth in the passage, but its contents spread the opening wide. Would repeating the caught-cloth action address that observation? Describe a supported next choice and a stopping condition, without trying it.
5. A second zipper has coil elements rather than the metal model's hollows. What can you still explain with the Y-route idea, and which exact-shape claim should you withhold?
6. Why isn't "friction" enough of an explanation for every resistant slider? What observation would make you ask about obstruction or loaded edges instead?

Answer guidance and tempting alternatives

1. The joined length is away from the small slider. A continuous-clamp explanation can't account for that whole section. A learner saying "the teeth lock" has the right direction; ask how the model's shapes accomplish that fit.
2. The slider's passage guides the rows. Alternating projections and recesses retain connection in the particular metal design. Avoid claiming the slider glues them or that contact friction alone retains every tooth. Compatible fit matters; the chain isn't indestructible.
3. Same slider, chain, clear lining and mostly empty condition; direction changes. Closing produces engagement; reversal guides separation. Rotating the whole item changes "up/down," so direction labels should be opening/closing relative to the chain.
4. Cloth release addresses unwanted material in the route. Wide loaded edges are different. Manufacturer guidance supports reducing contents and bringing chain sides close before gentle closure. Stop if normal gentle movement fails or damage appears. "Inspect first" is also acceptable: the information doesn't diagnose every real failure.
5. General guided joining/separation remains available. Exact alternating cup/projection/recess geometry belongs to the stated metal model; a coil needs its own construction evidence. Recognizing

this boundary is useful reasoning, not an incomplete answer.

6. Friction names contact sliding resistance. A fold physically occupying the route or contents spreading/loading the edges requires additional explanation and different actions. Don't insist a learner must isolate a numerical friction contribution; this setup cannot do so.

Other tempting ideas: "harder always works," because motion needs force; respond by comparing what the pull is being asked to do under each condition. "Up means close," because jackets commonly sit vertically; turn the drawing sideways. "All pull tabs lock the same way," because some sliders have locks; distinguish preventing slider travel from retaining the joined chain and leave type-specific operation to applicable guidance.

Unexpected answers: ask the learner to point to the observation supporting their account. If the item cannot show it, separate "I saw..." from "the model explains...". Record uncertainty. Do not treat Quinn's successful bag as a test result or require the learner's item to reproduce it.

One learner, siblings or a group

For one learner, an adult reads only the pre-reveal prompt, listens to a sketch/verbal prediction, and lets the learner inspect the available item or diagram. Use "What makes you think that?" and "Which part remains joined?" before naming a mechanism. Then read the reveal together and revise the initial sketch.

For siblings or mixed experience, let one describe visible states, another track motion, and another distinguish evidence from model. Rotate roles; do not make the most experienced person give the answer first. A younger sibling can point to joined/separate states in a large diagram while the older learner explains retained engagement and limits. Physical handling can remain with the adult.

For a classroom or small group, pairs can compare sketches using a single shared diagram instead of needing an item each. Ask groups to report both an explanation and one thing the activity cannot establish. No competition for fastest closure is needed.

Simpler adaptation: use only the joined/separate comparison, three part names and one Y route; introduce projection/recess through labeled shapes after the route is clear. Deeper adaptation: ask learners to rewrite motion labels for a fixed-slider viewpoint and identify why a friction coefficient or safe-force number cannot be calculated from this observation. Neither route requires formulas or a chain of prior lessons.

Evidence and continuing curiosity

Use the source notes at the end of the paired story: YKK for contemporary guidance and practical limits; the original Sundback design for the specific metal model; Coats for independent type-scoped clearance evidence; NASA for force/friction definitions. The activity is a conservative proposed observation derived from that bounded evidence, with no measured duration or learning result.

Optional further question: how does a pull tab release a lock in particular slider types? That is a proposed investigation, not a promise that every tab operates identically. The separate force lesson is optional; the force and friction explanations above remain available offline.