

Dual Latching System

3rd Grade STEM

Jill Work
FASP STEMLab
jill.work@ecoleprinceton.org

Subject(s)	Inquiry Question(s)
Engineering techniques	How can you design and build door latch systems with mostly cardboard?

Materials
Pre-cut pieces of cardboard (older students can cut their own)
Jumbo craft sticks with at least one hole punched near one end
A brad (brass fastener)
A single-piece clothes pin with a flat side
Glue
Misc. attaching supplies (binder clips, Velcro, push-pins, rubber band, magnets)

Teacher-led activity/demo
Show sample and lead discussion; explain task; demonstrate technique as needed

Student Tasks	Rubric Goals
View sample and observe/discuss how it's made	Active listening Raising hand, participating in discussion Observation skills
Replicate given design with provided materials; add drawings and/or words to inside (to be seen when latch is open)	Reverse engineering Assembling
Brainstorm on other ways doors are kept closed (cabinet doors, room doors, box lids, etc.)	Brainstorming Problem-solving
Design a different latching system and sketch or make notes on how it's made and what materials are needed	Creative/conceptual thinking Participation Engineering design
Build the original latch on the opposite side of the cardboard from the non-original latch	At least 12 techniques Clear and neat
Allow the teacher or a fellow to try the latch; make it sturdier or otherwise iterate as needed	Testing design Iterating design

RUBRIC for Assignment

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30 (31) Possible Points each	Room for improvement (1-3) IB 1-2	Meets most expectations (4-6) IB 3-5	Meets or exceeds most expectations (7-10) IB 6-7	Extra credit (+1/2 point each) IB 8
Objective	Incomplete	Skipped some tasks	Both side completely done	N/A
Ideation	Little to no originality in second latch	Somewhat original second latch	Original second latch	Exceptionally creative original design
Technique	Sloppy, not sturdy	Pretty good technical construction	Very good technique	Exceptional technical skills
Function	Latches don't work consistently	Does not work consistently	Works as it should	N/A

INSTRUCTIONS: 1. Cut a cardboard rectangle into 3 pieces like this. Then cut additional piece identical the the orange and green pieces.





(flat clothes pin)

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2. Glue the narrow strip to (green) the right edge of the largest piece (brown).
3. Use three pieces of masking tape to hinge the medium sized cardboard (orange; this is the door) to the other edge of the large piece (beige).
4. Glue a 1-piece clothes pin onto the narrow strip (green) with the opening at the top.
5. Lay a craft stick with a drilled hole (the latch stick) diagonally across it in such a way that the latch stick slides down into the clothes pin.
6. Use a pen or marker to where the hole goes.
7. Use a golf tee or an awl to punch the hole in the door (orange).
8. Then flip the assembled latch over and do the same on the opposite side: glue the narrow strip back to back with the narrow strip, hinge the door in the same place as the door.
9. Create a different latching system.
10. Open each door and draw or write something inside the door.

