

Pencil Holder

Lesson Overview: Students will design something to hold the 8-12 pencils/crayons on their desk or table.

Suggested Time: 30-60 minutes depending on age

Learning Objectives:

- To gain practice collaborating with a partner
- To better understand the properties of materials
- To gain experience testing
- To gain an understanding of constraints and criteria

Materials: A variety of materials can be used for this activity. It can serve as a materials exploration. Possible materials include interlocking building brick (standard size and large), craft and recyclables.

- Interlocking building bricks
- Cardboard
- Paper tubes
- Popsicle sticks
- Tape
- Paperclips
- Pencils, makers, pens, or crayons

Design Criteria:

- Must hold 8-12 items
- Must be sturdy enough to stay together
- One holder must be built between partners

Directions

1. Explain to students that they will build something to hold some of the materials on their tables/desks.
2. Discuss possible constraints and criteria for the device. For example, the device should be:
 - a. sized to fit on the table and still allow students to work.
 - c. able to hold the specified items.
3. Show the students the materials to choose from.
5. Students can sketch their initial designs. Once they have a sketch, they can begin building. As you circulate, ask students questions about certain design decisions.
6. About 15 minutes into building, bring the students together and have each group share their ideas. Ask the group for ideas for any part that is difficult to build. This step takes more time, but it helps to build the community of collaboration.
7. Students should have pens and pencils at their workspace so they can test as they go. Lead a discussion of the designs to help them analyze and interpret their designs.
8. Have students keep iterating, encouraging them to analyze and interpret after testing.
9. Be sure to leave time to have a final discussion with the class to talk about their design process.