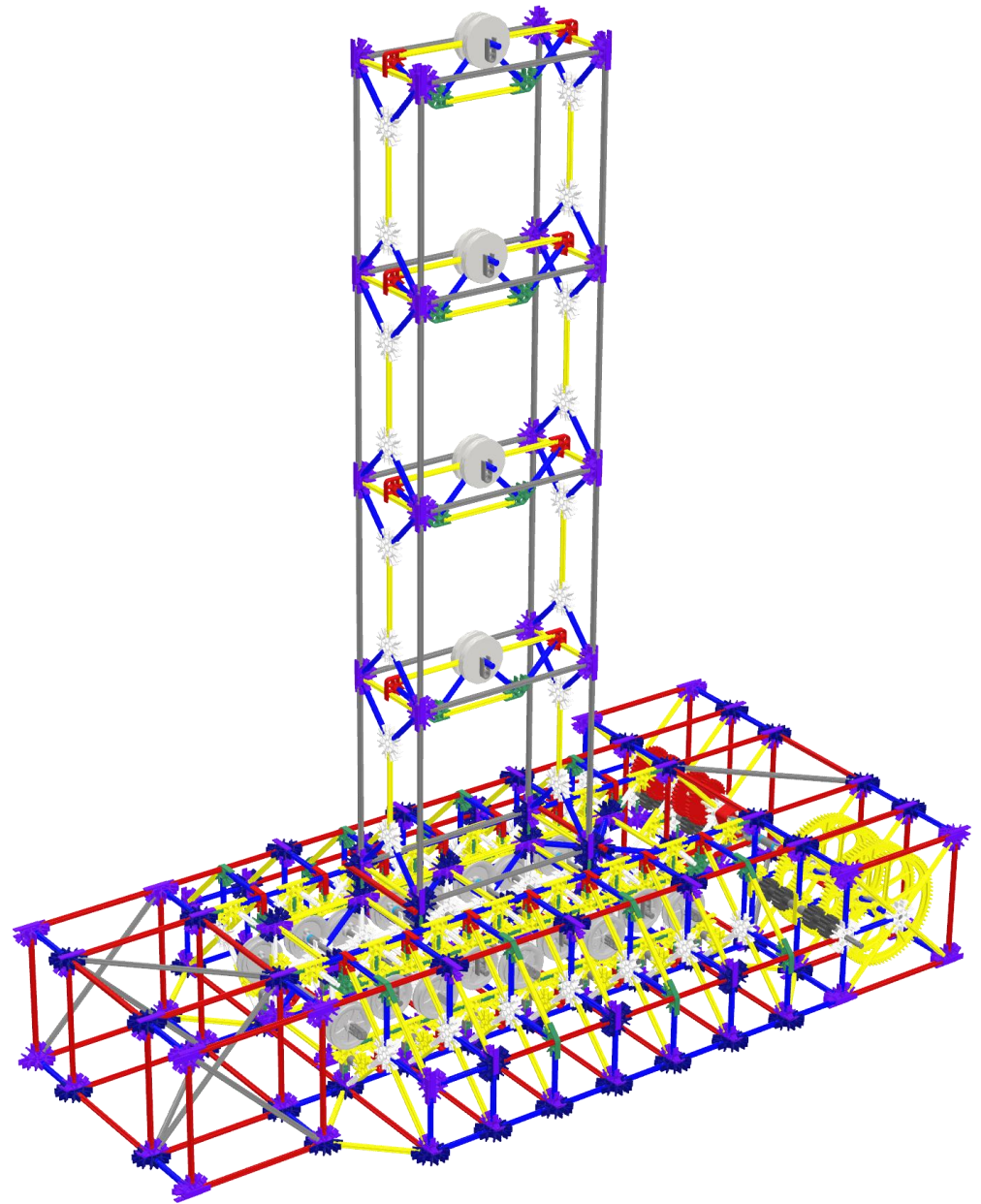


K'NEX Shake Table Instructions

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Project Advisor:
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Michigan Technological
University



About

This shake table was developed to make structural dynamics a more approachable and affordable topic for all ages.

Thanks to Dr. Daniel M. Dowden (Dept. of Civil, Environmental, and Geospatial Engineering), who supported the development of the K'NEX shake table as part of a summer STEM internship program at Michigan Technological University.

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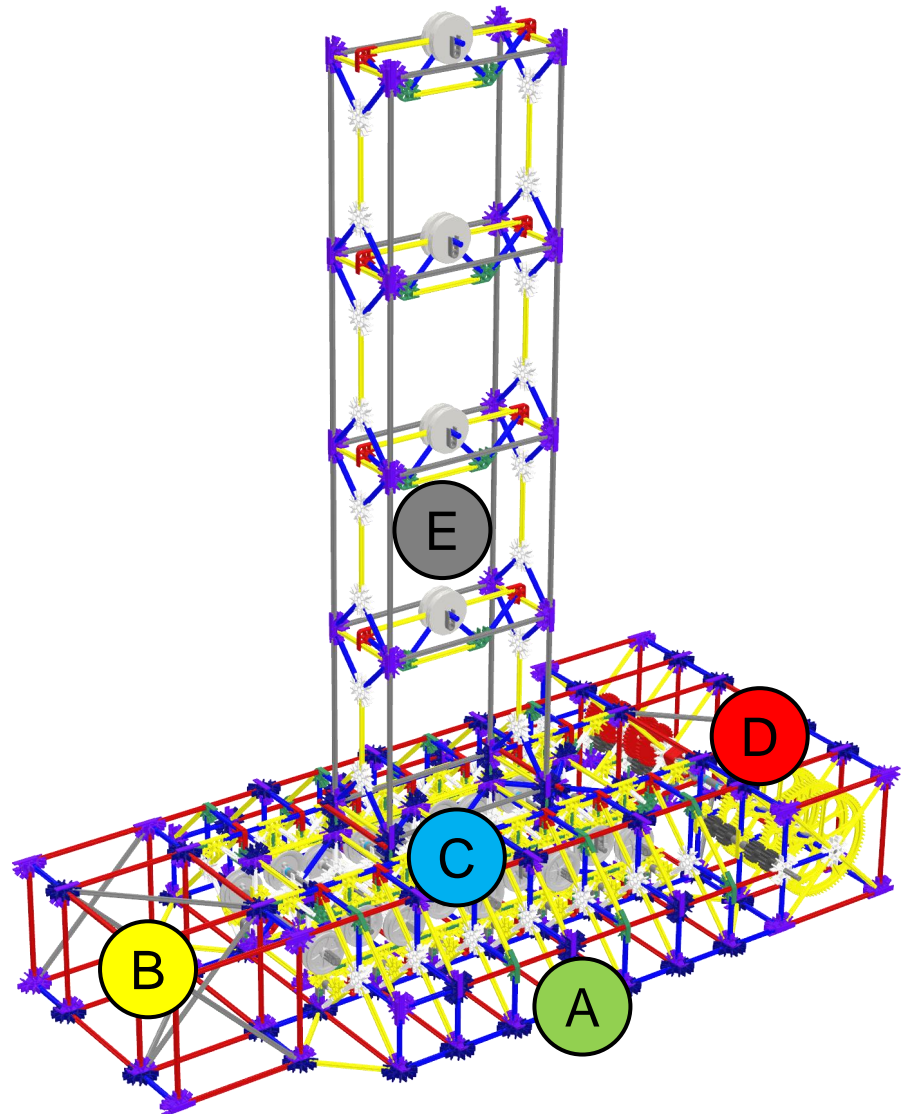
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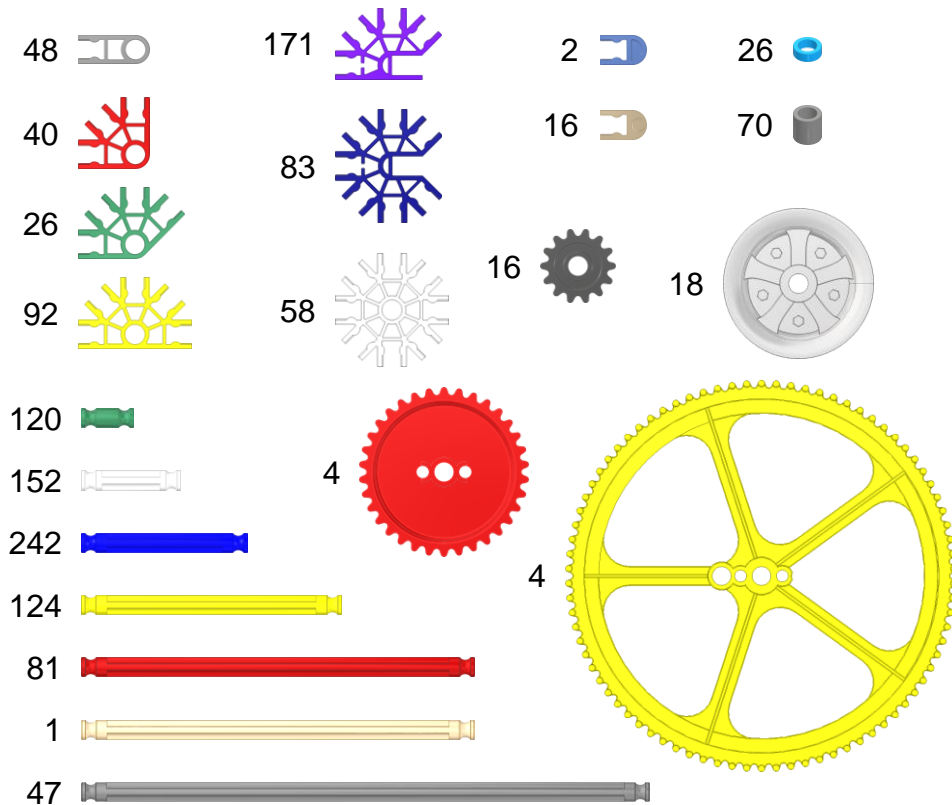
Overview:

The K'NEX shake table instructions is split into 5 parts:

- A. Track
- B. End Piece
- C. Cart
- D. Gear box
- E. Tower



Parts list:



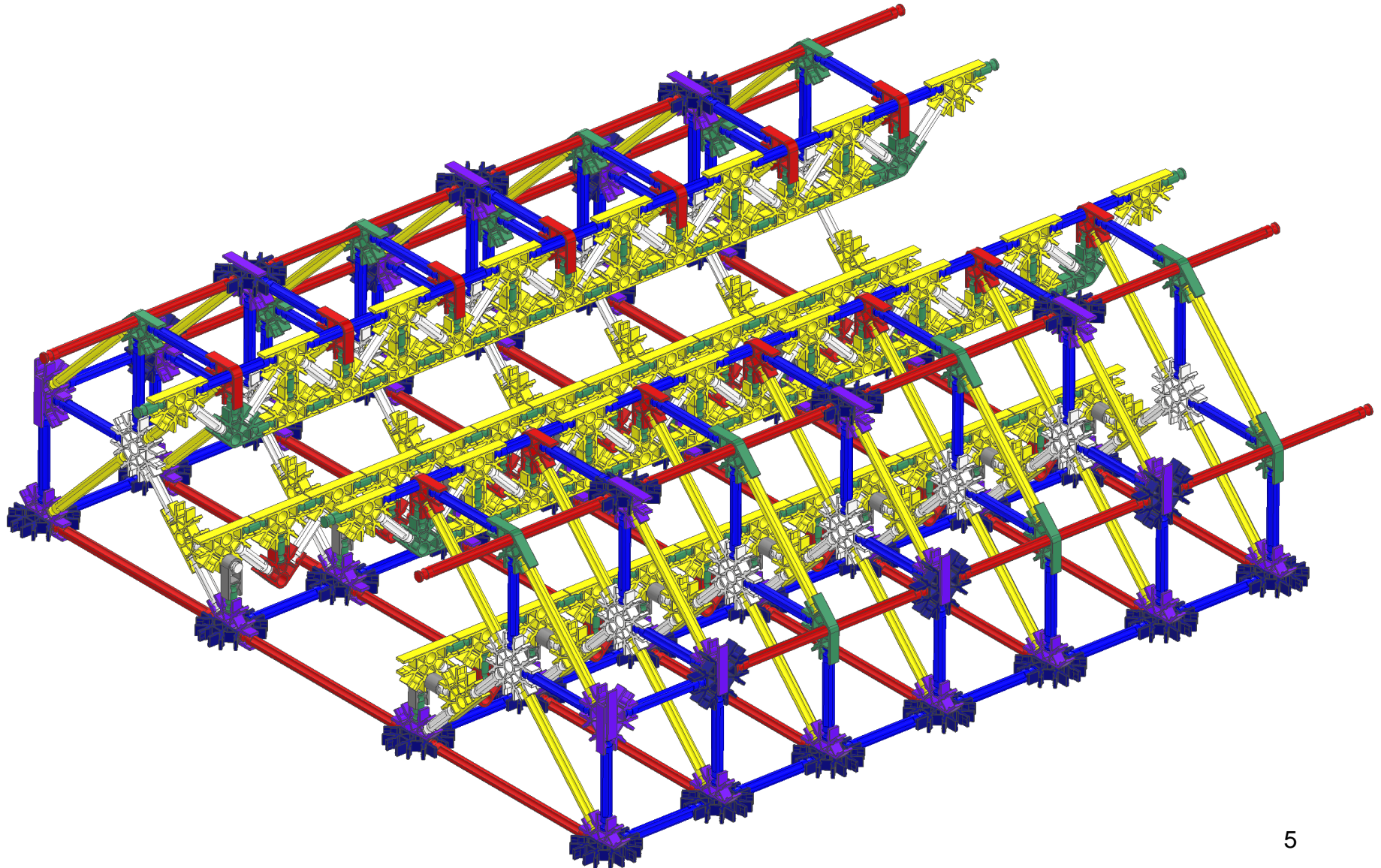
Non-K'NEX parts

1/4" inner diameter
large washers

Power drill

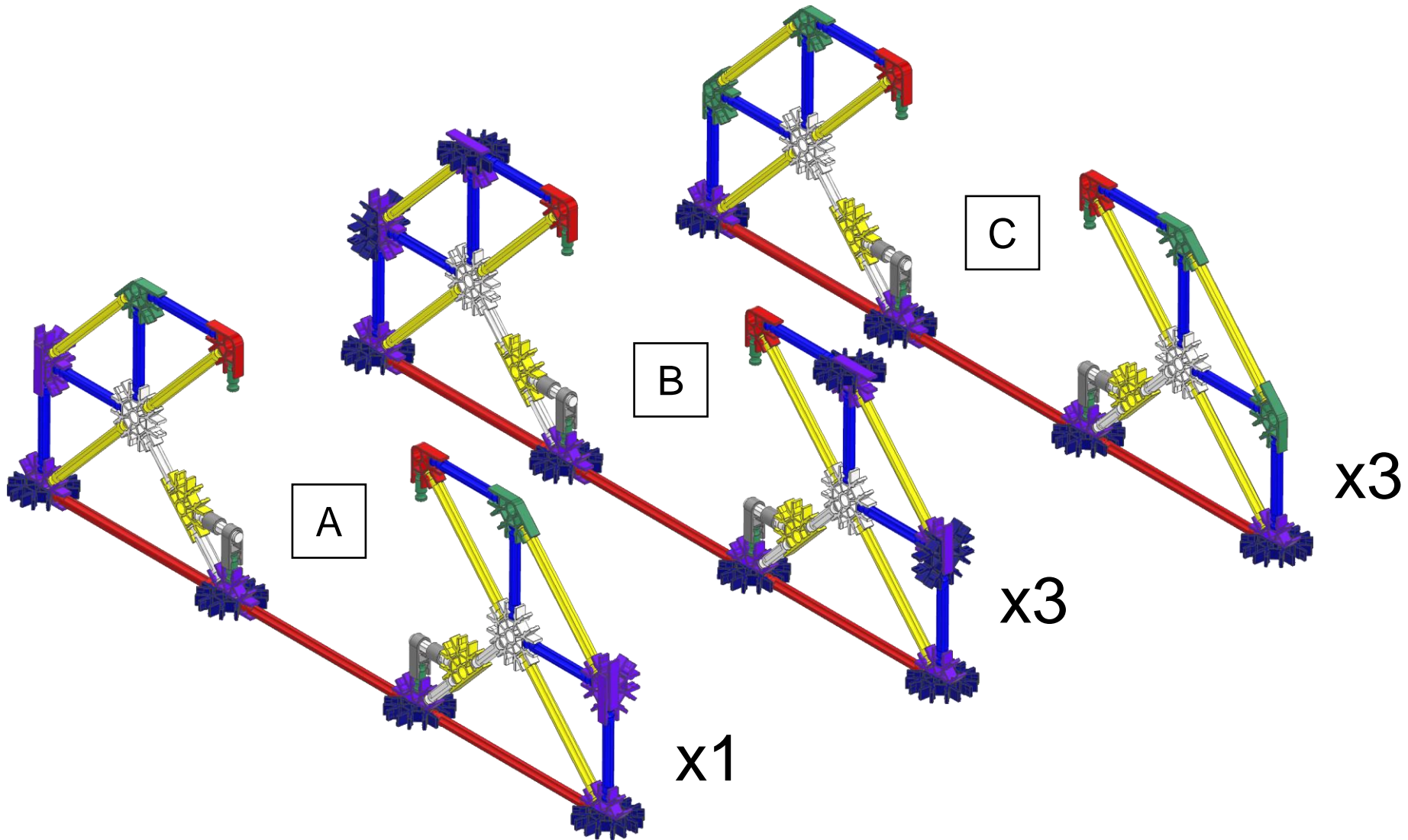
Part count is for shake table with basic 4-story building.

Part A: Track



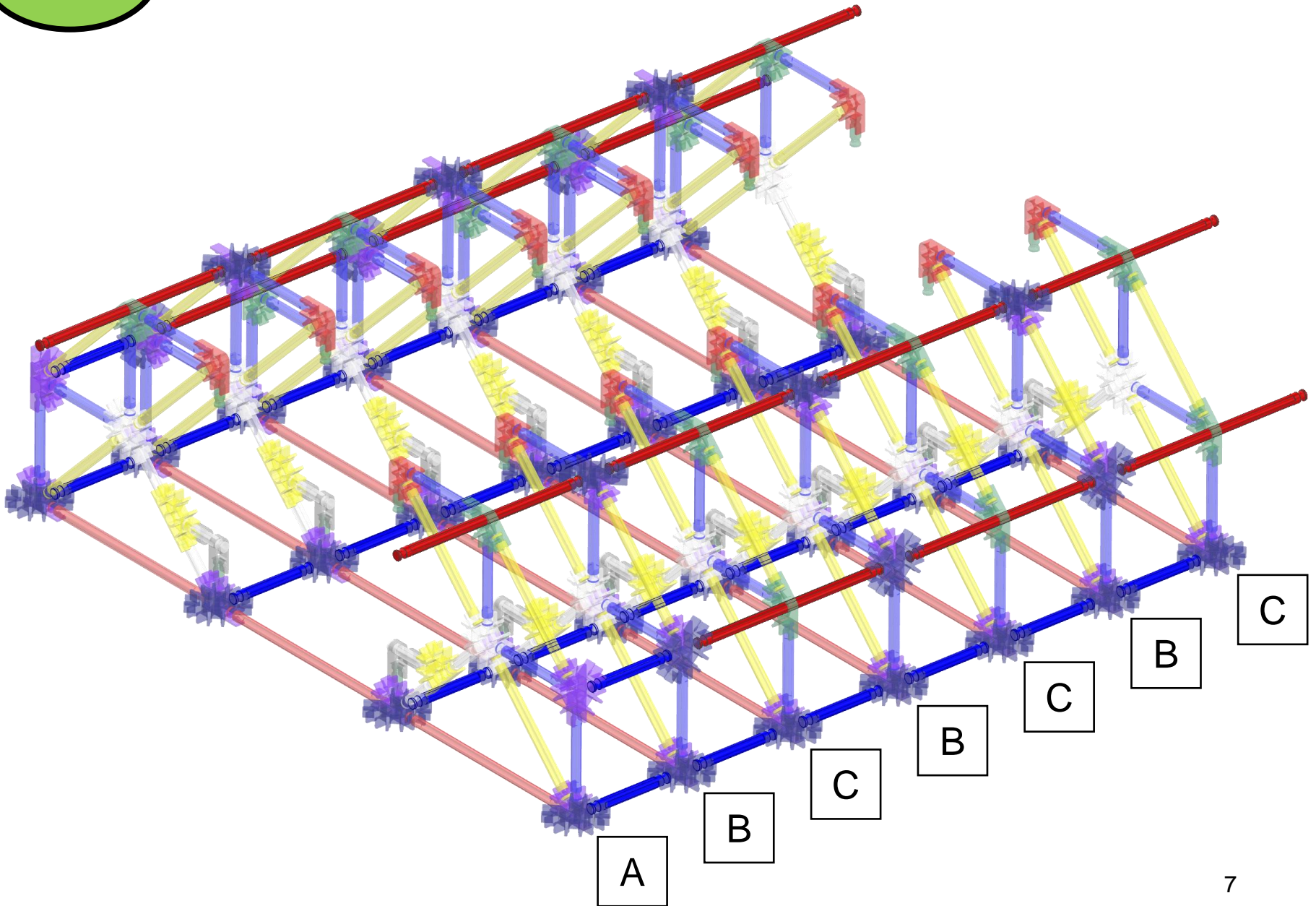
A1

Build track support sections



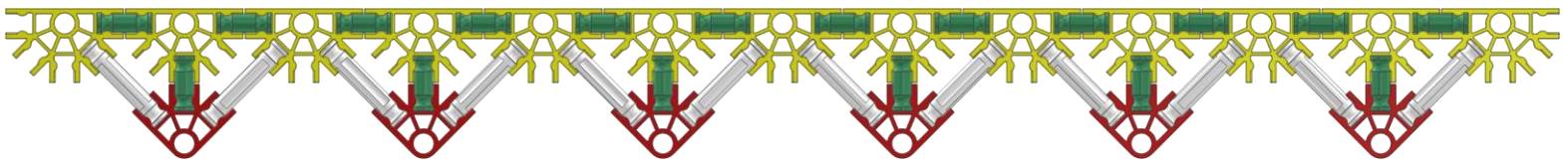
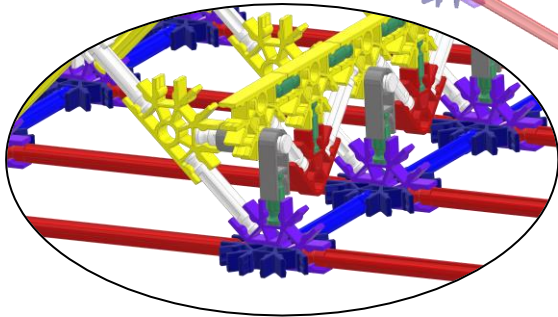
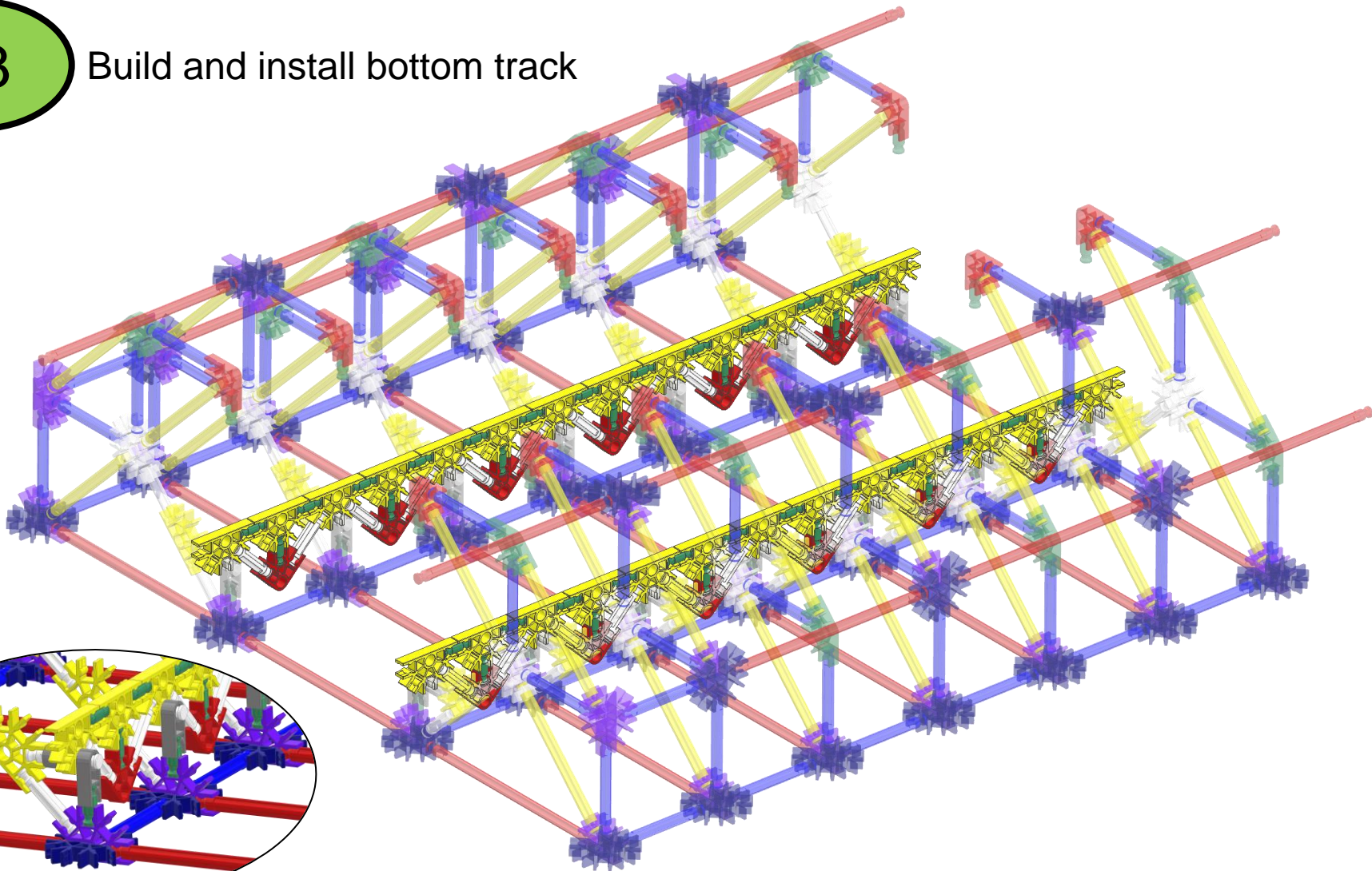
A2

Connect track support sections together



A3

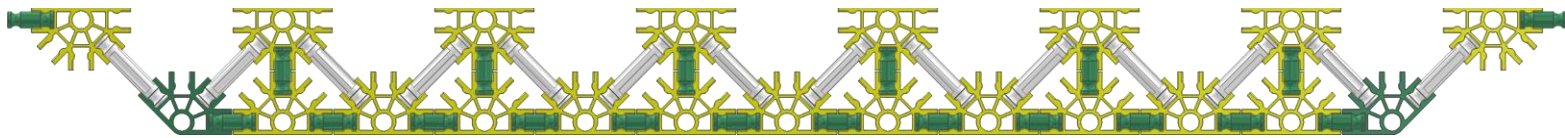
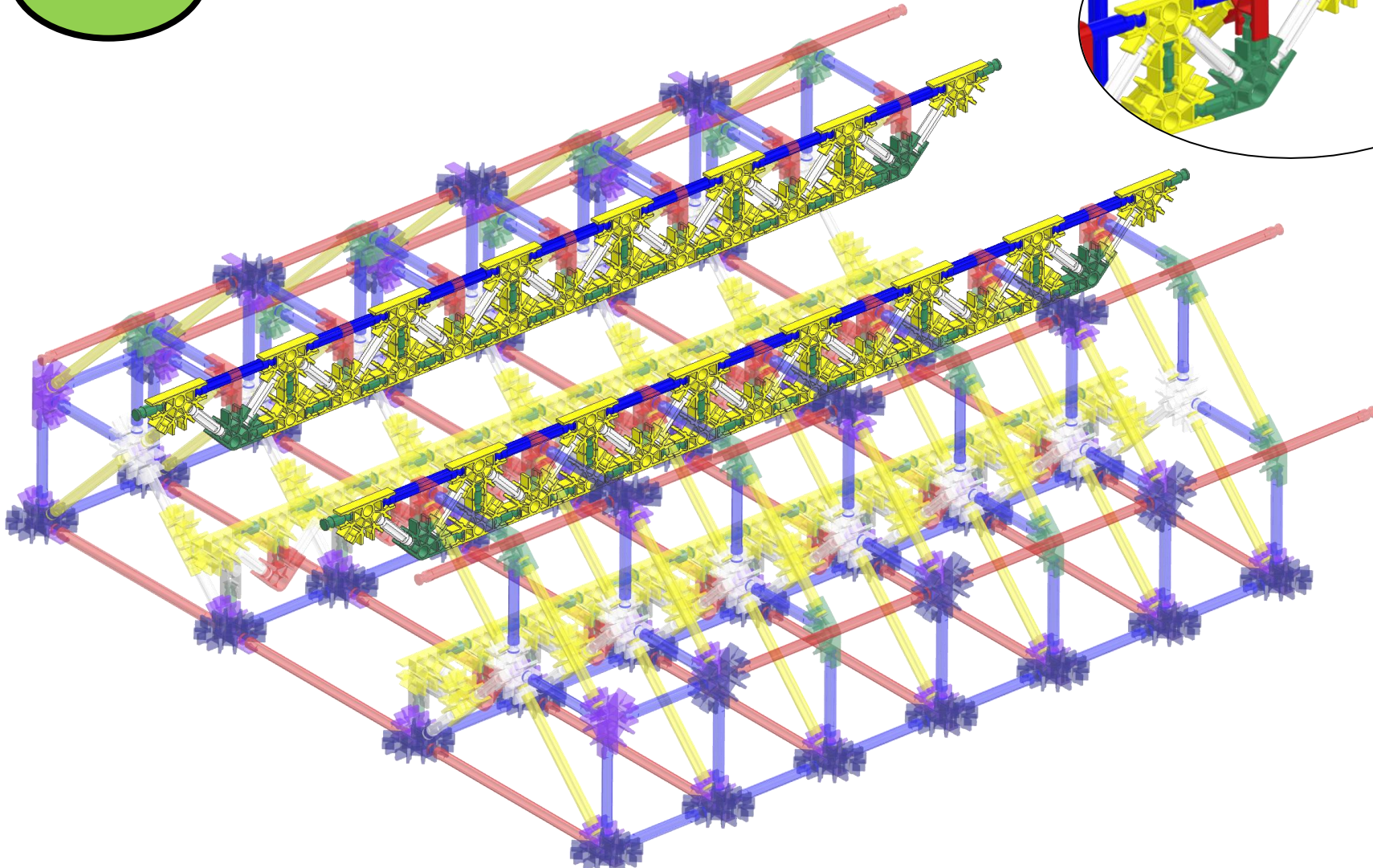
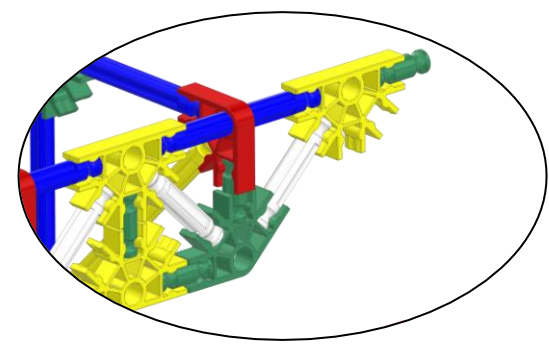
Build and install bottom track



x2

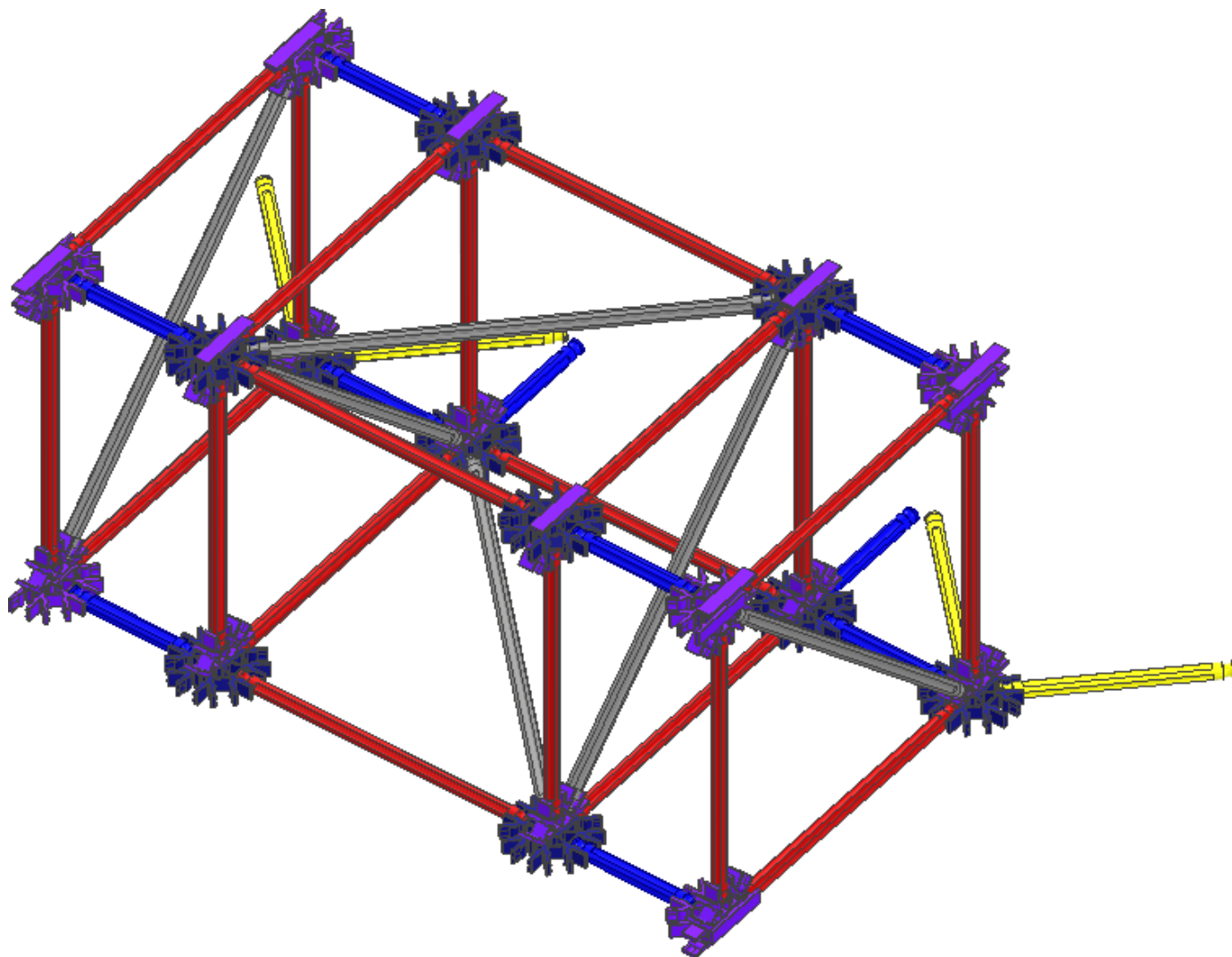
A4

Build and install top track



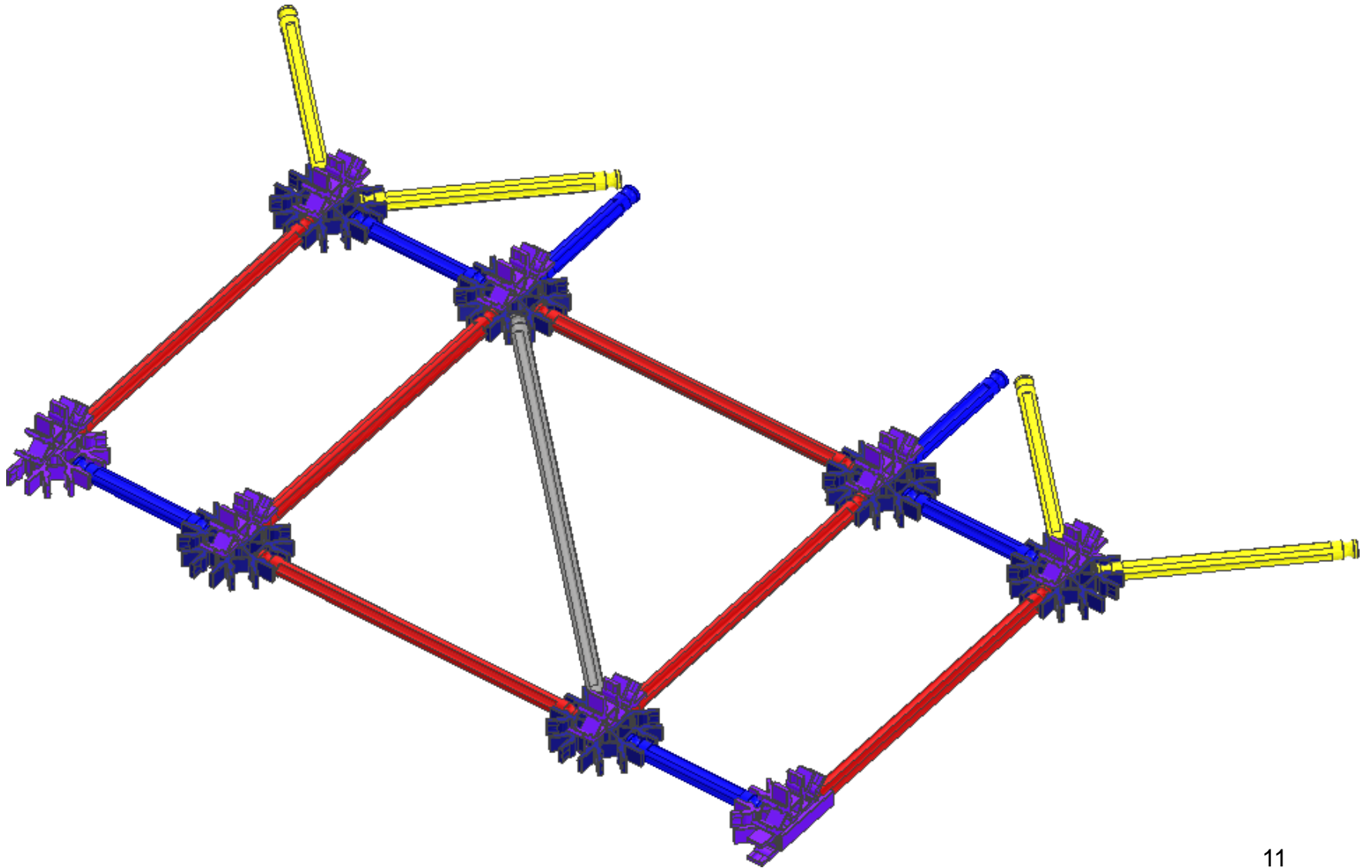
x2
9

Part B: End Piece



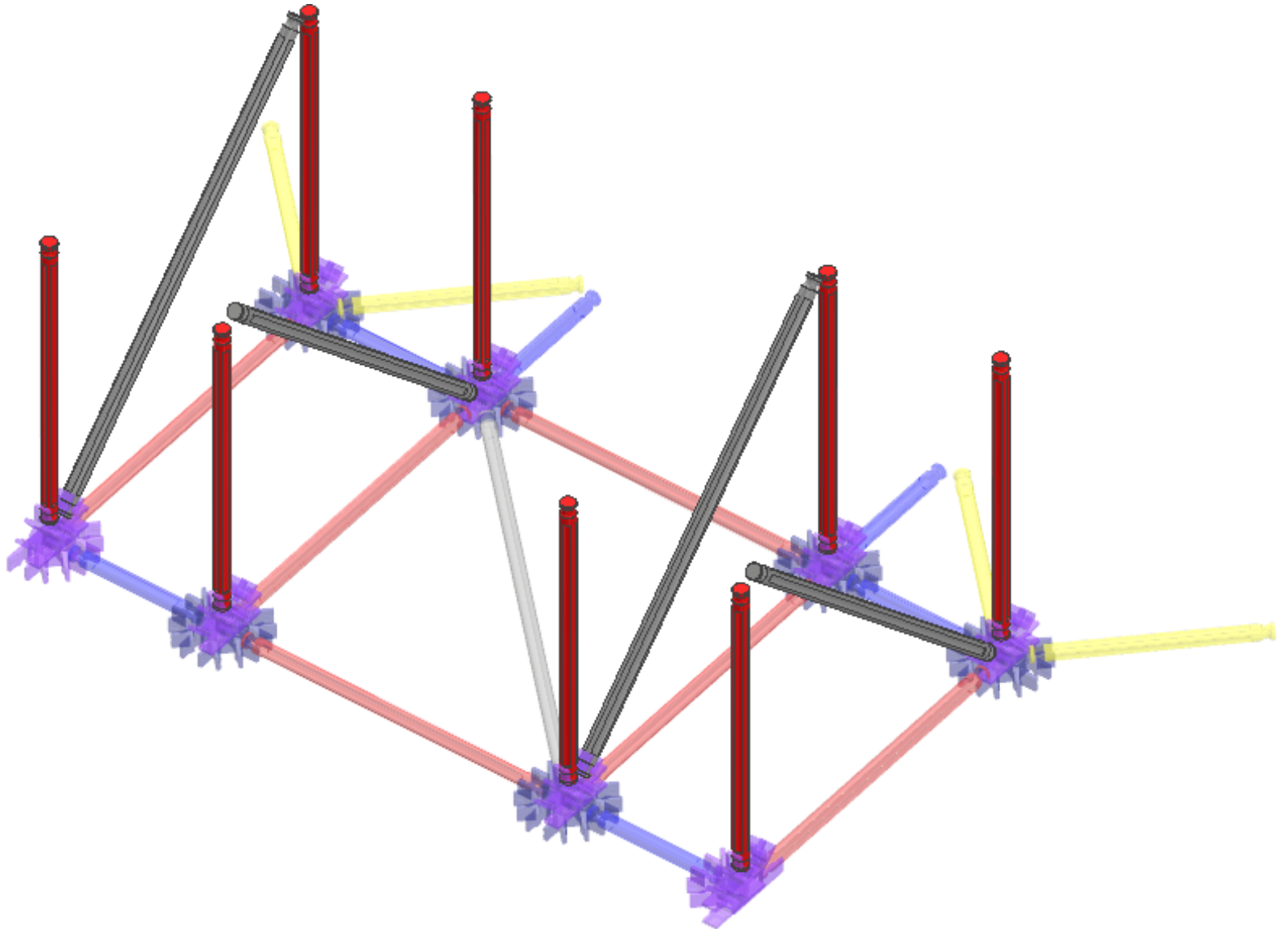
B1

Build base



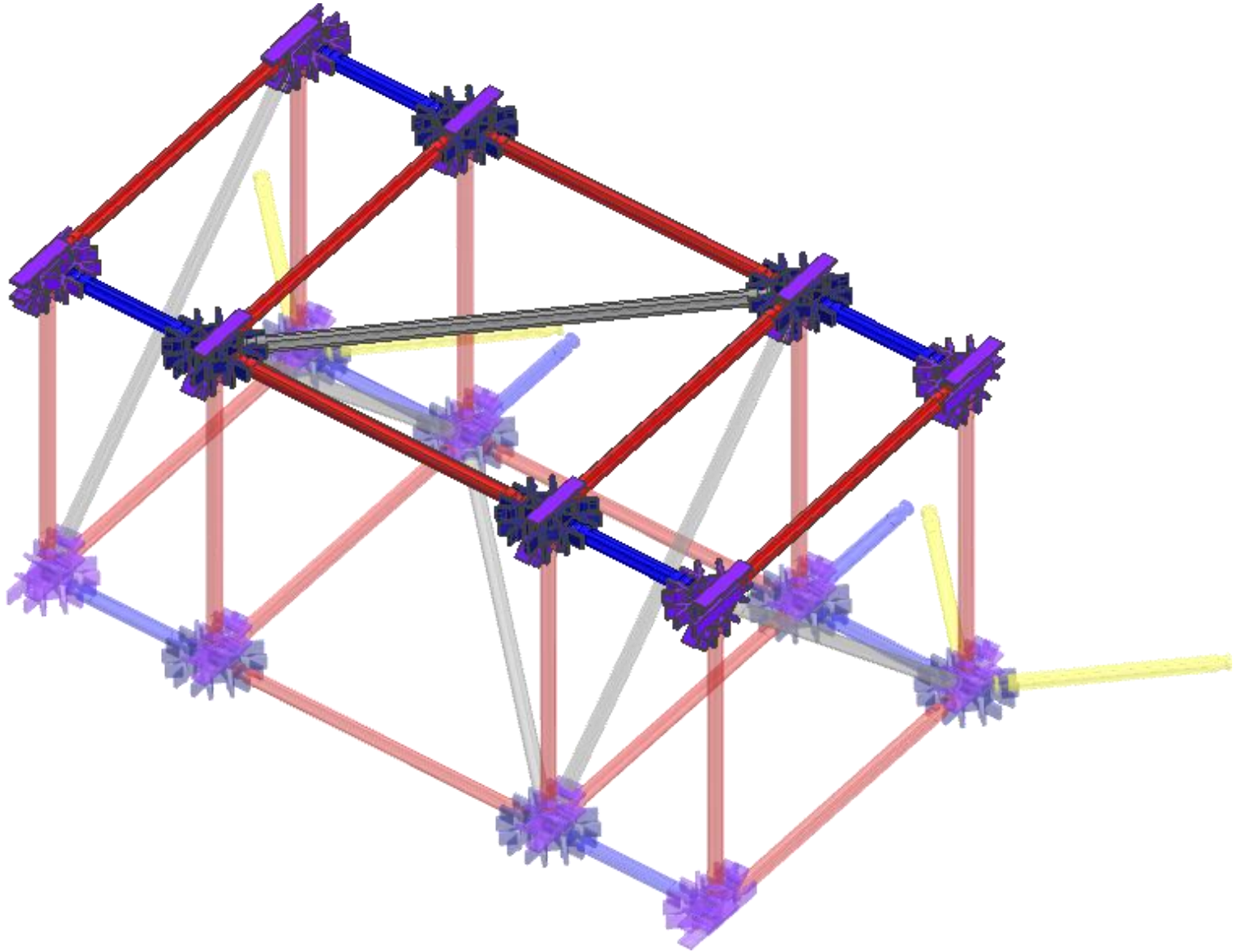
B2

Attach vertical rods



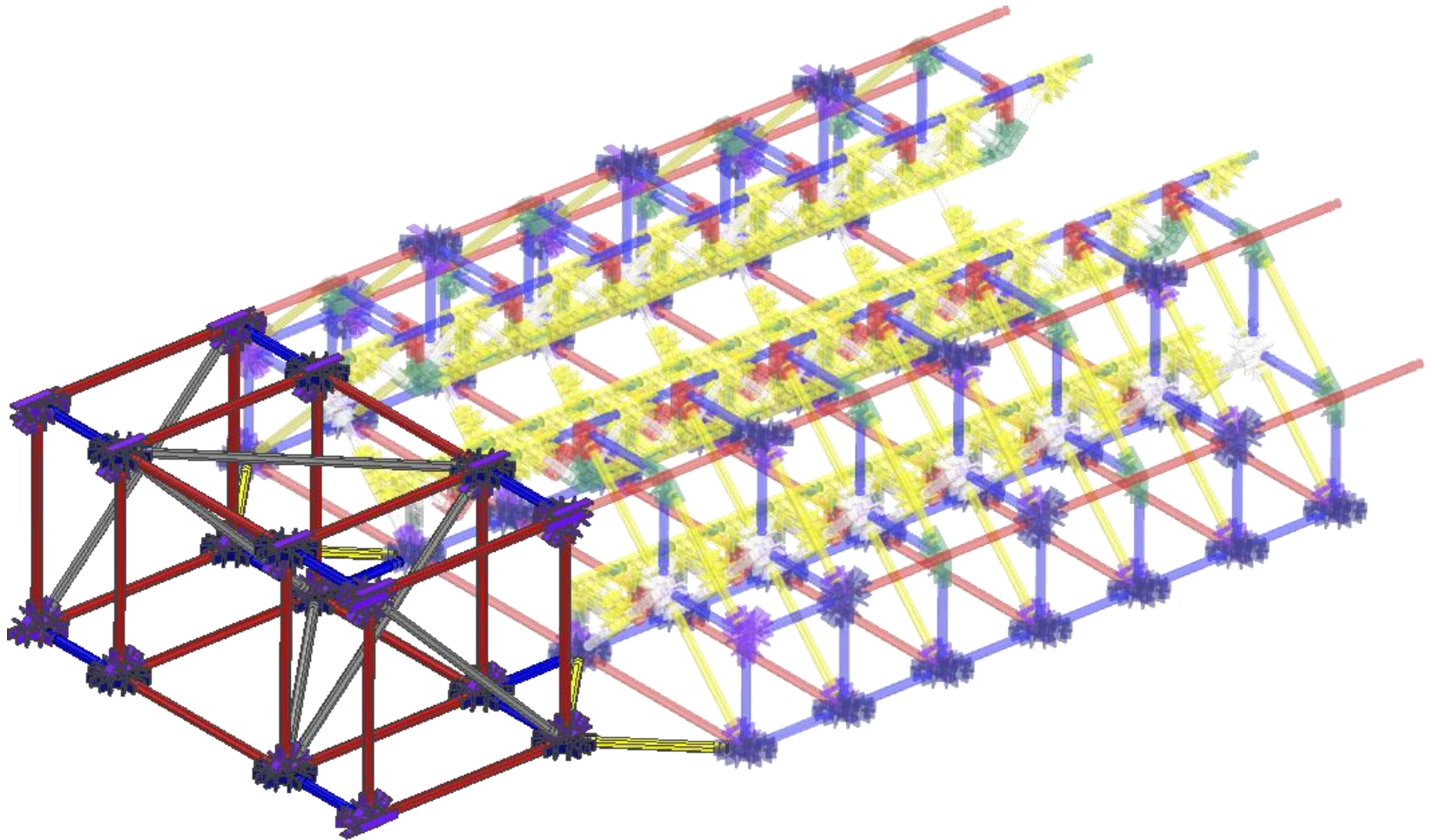
B3

Build and attach top piece

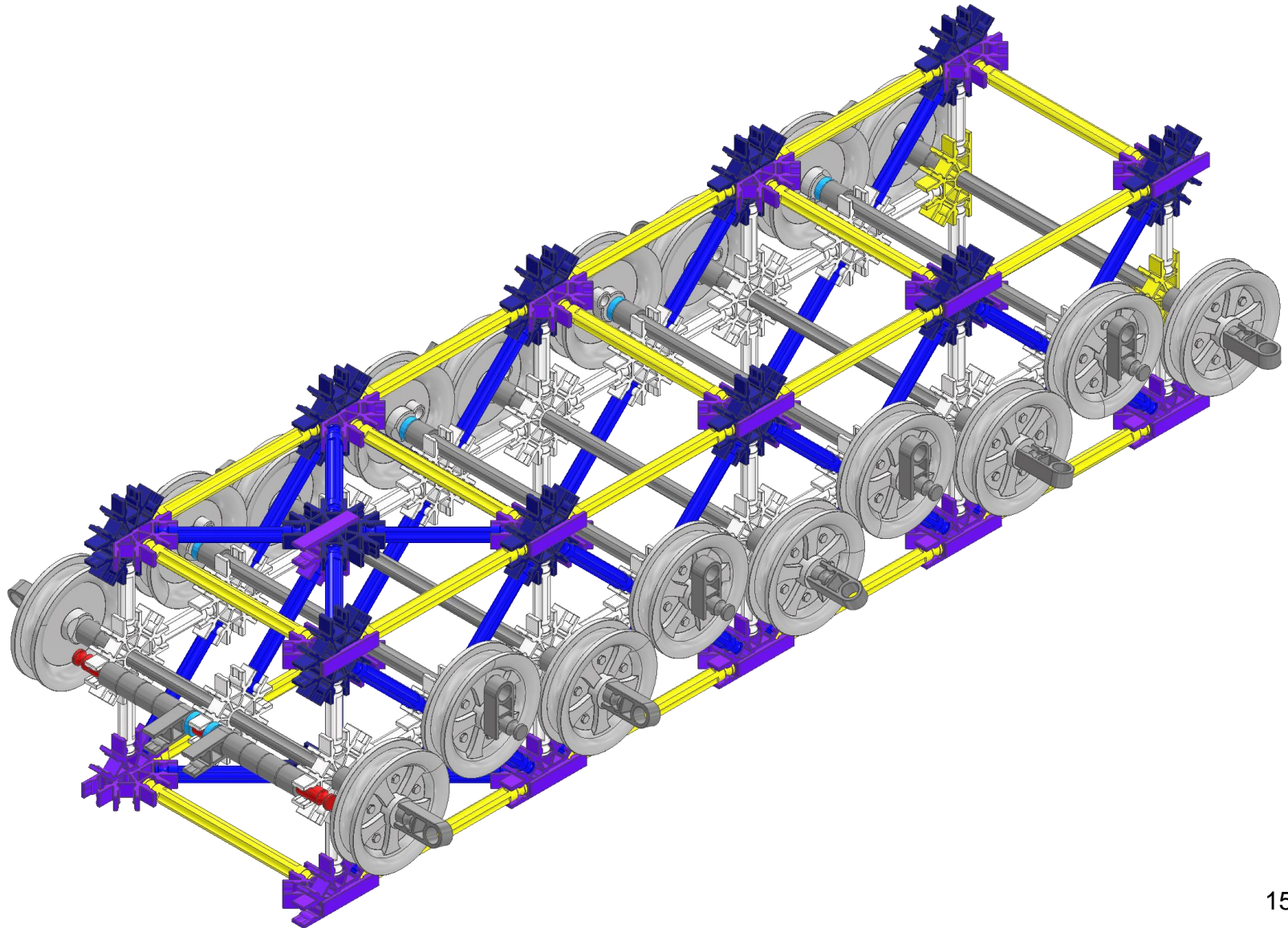


B4

Attach end piece to track

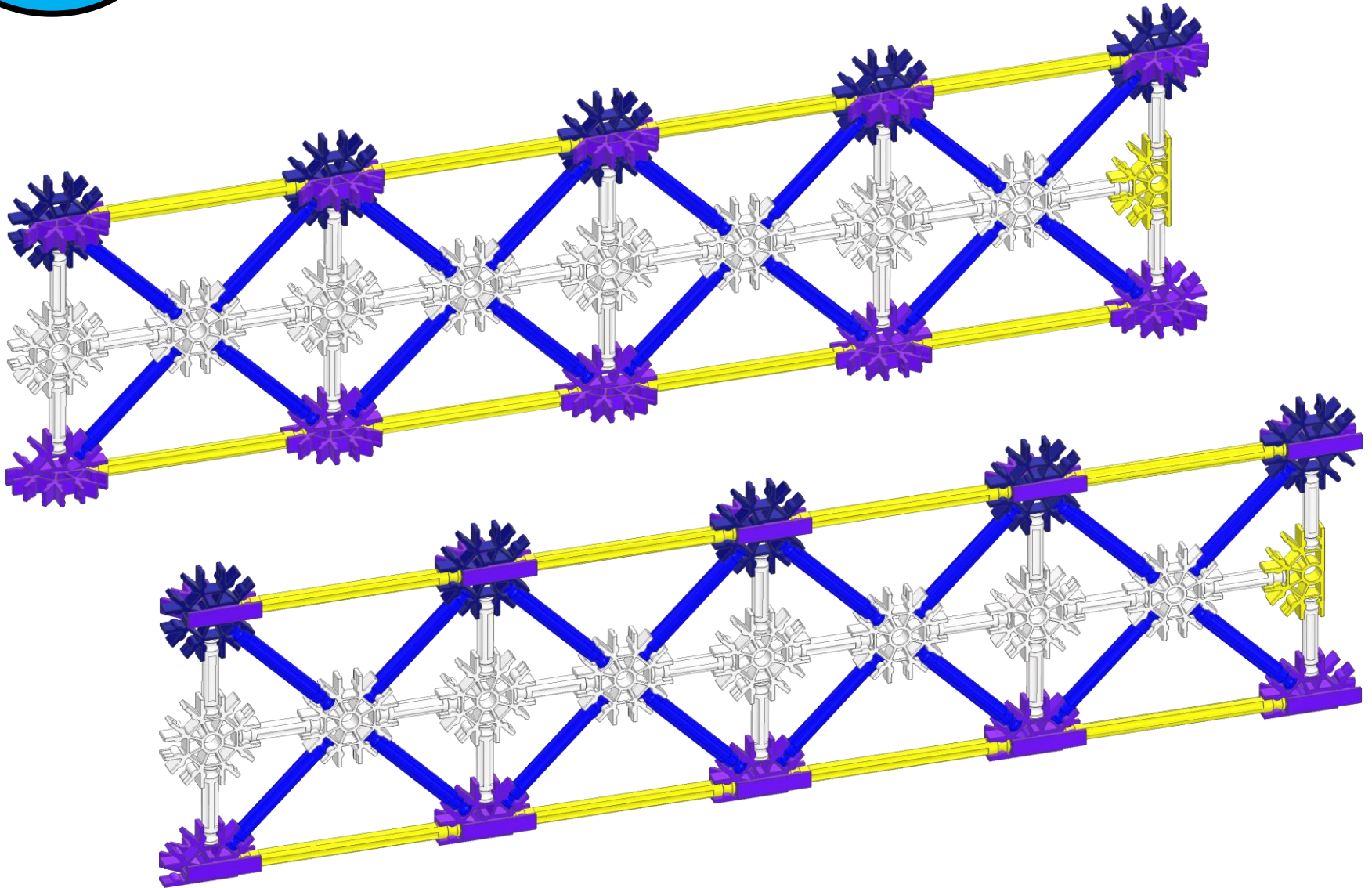


Part C: Cart



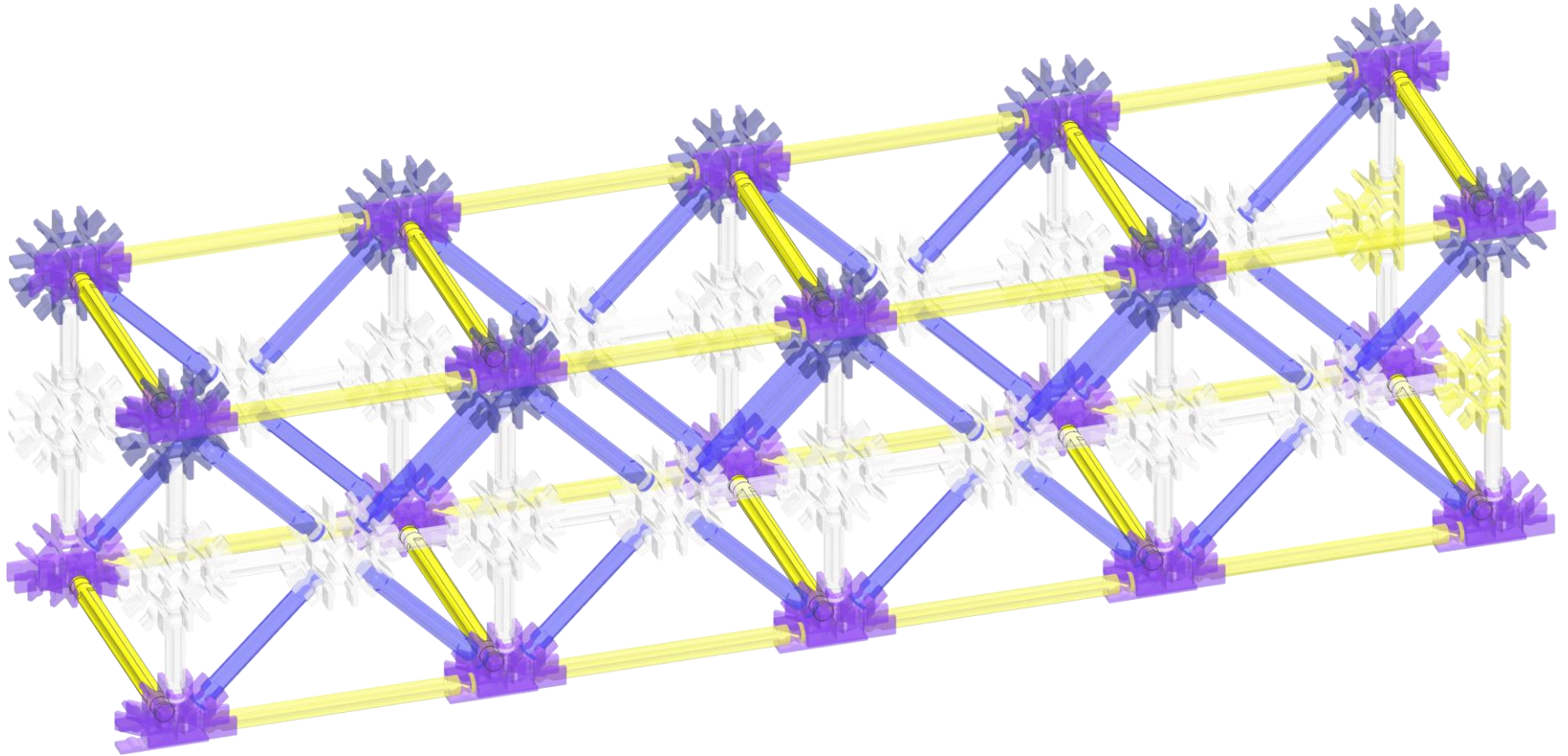
C1

Build cart sides



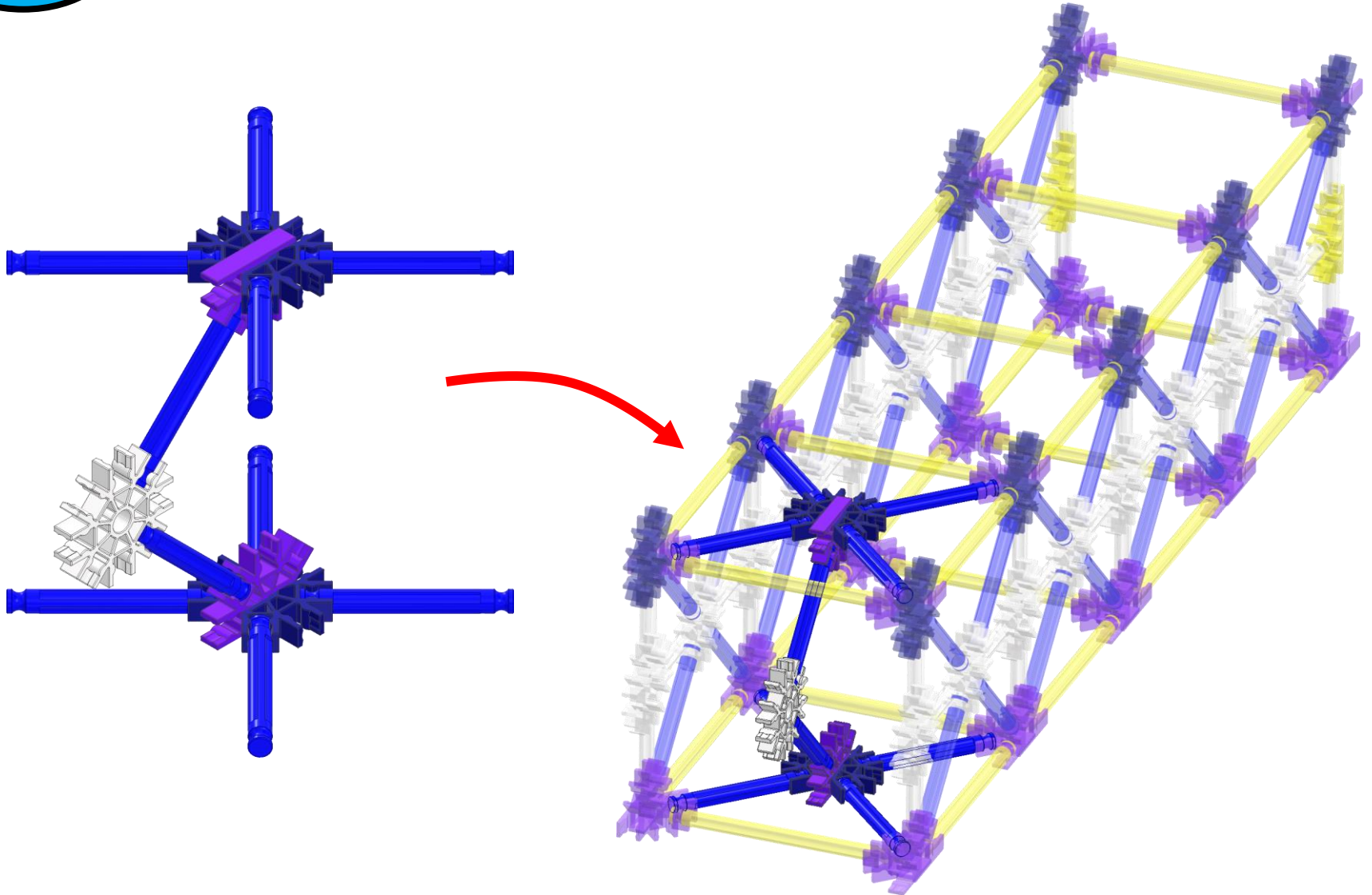
C2

Connect both sides together



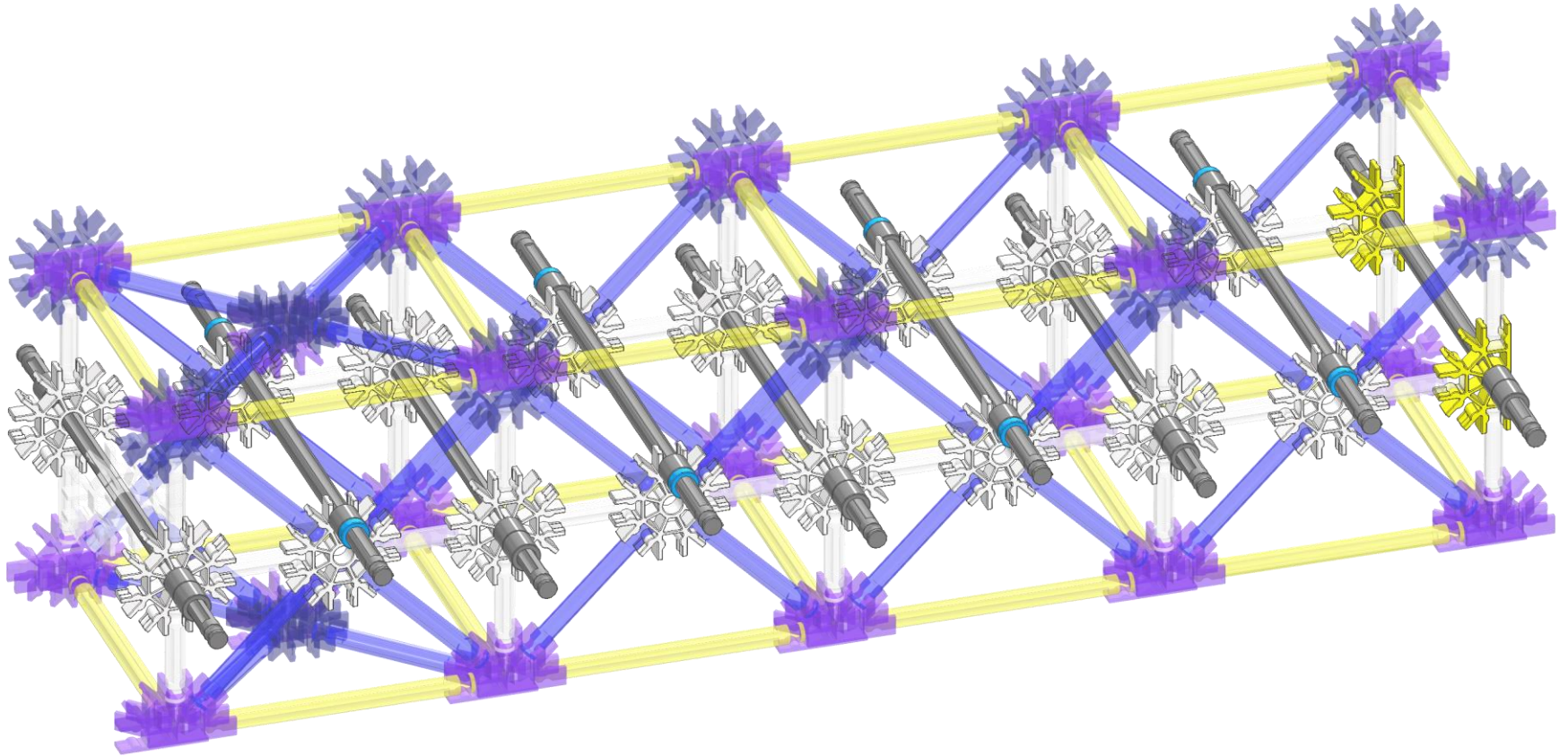
C3

Build and install reinforcement



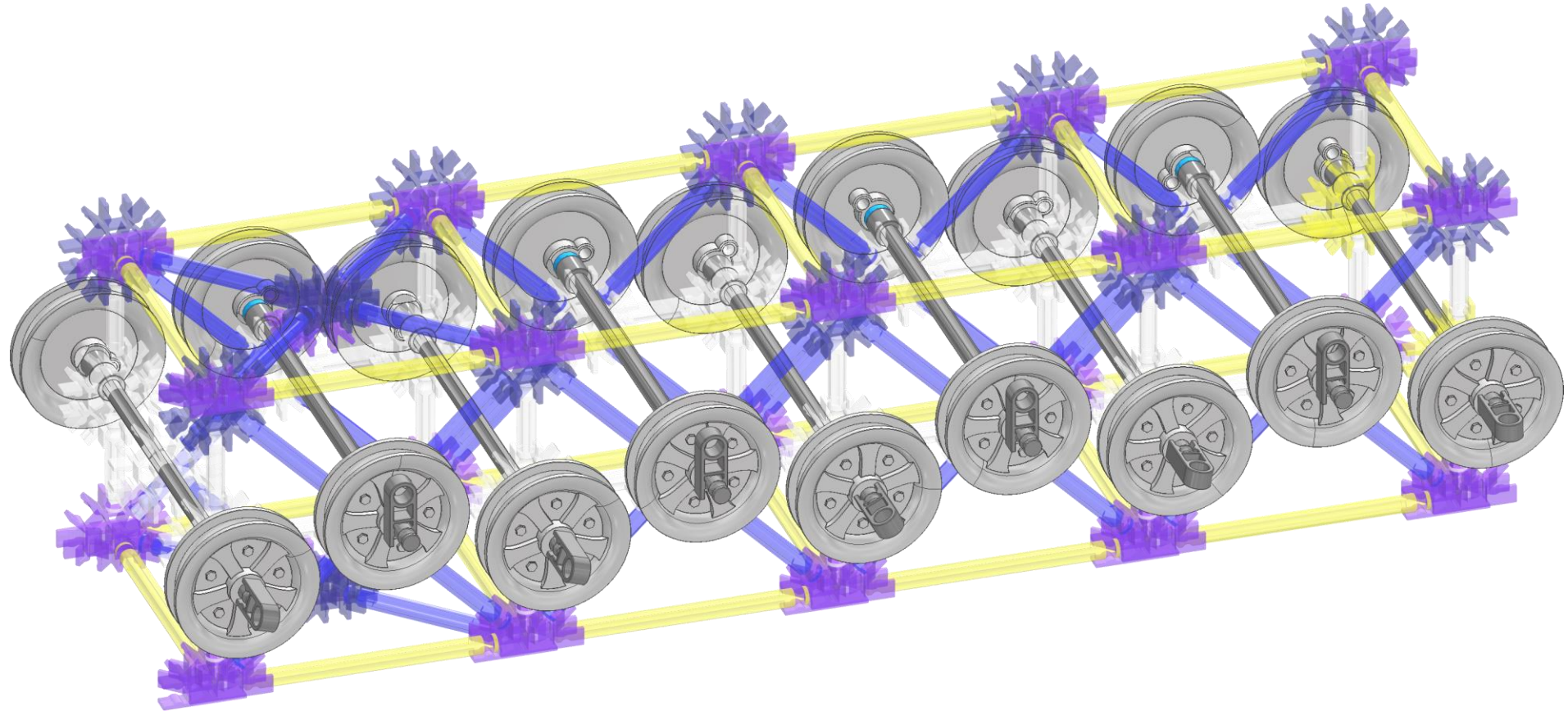
C4

Attach axles and spacers



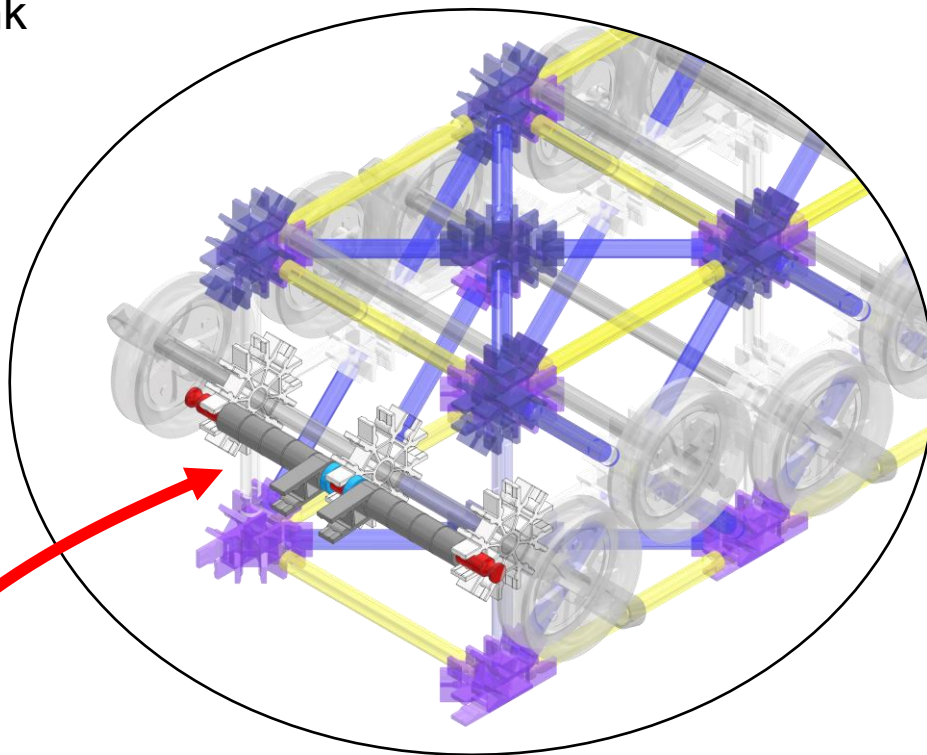
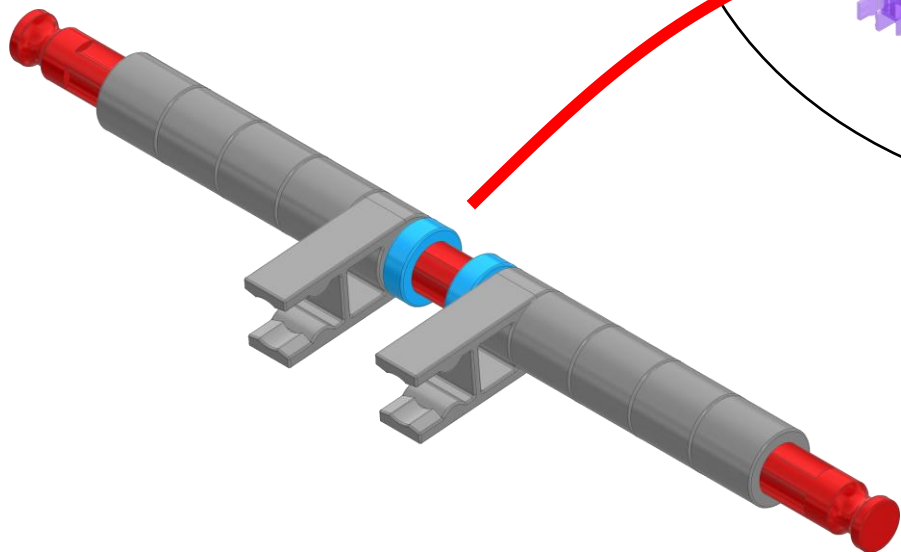
C5

Add wheels and secure with end clips



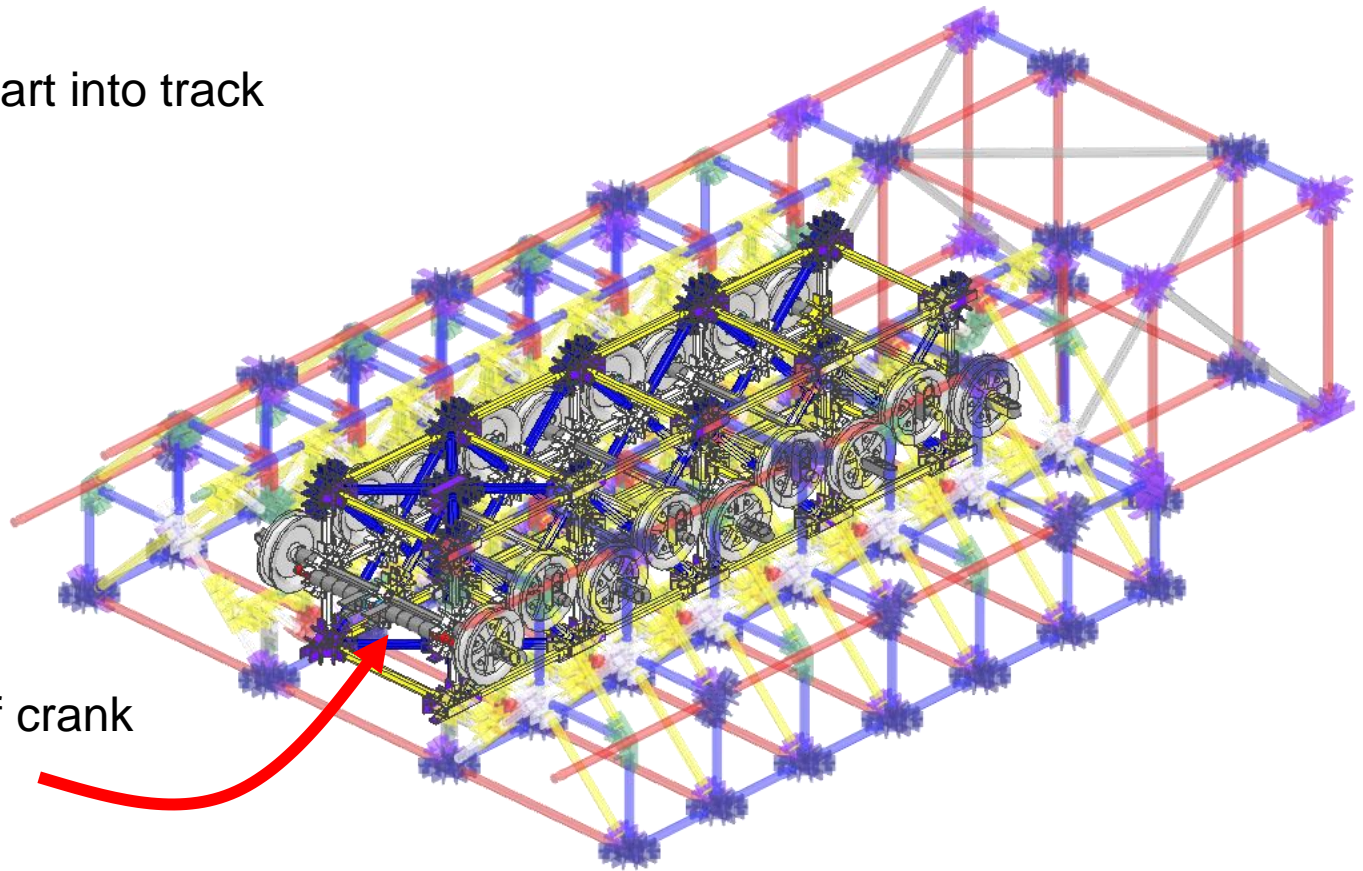
C6

Attach connection to crank

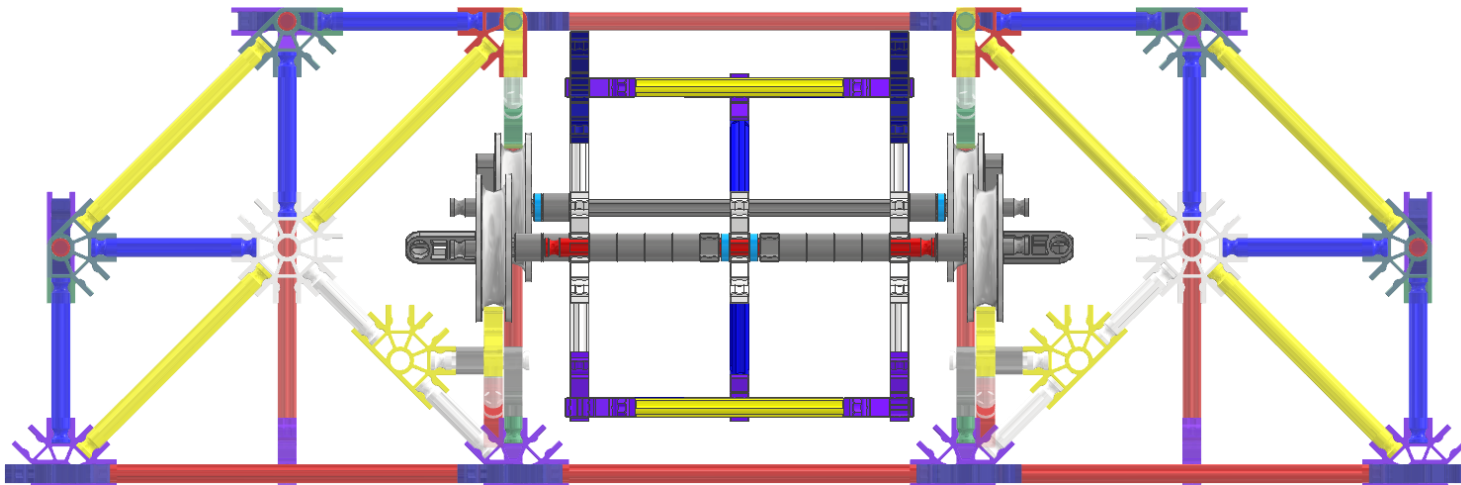


C7

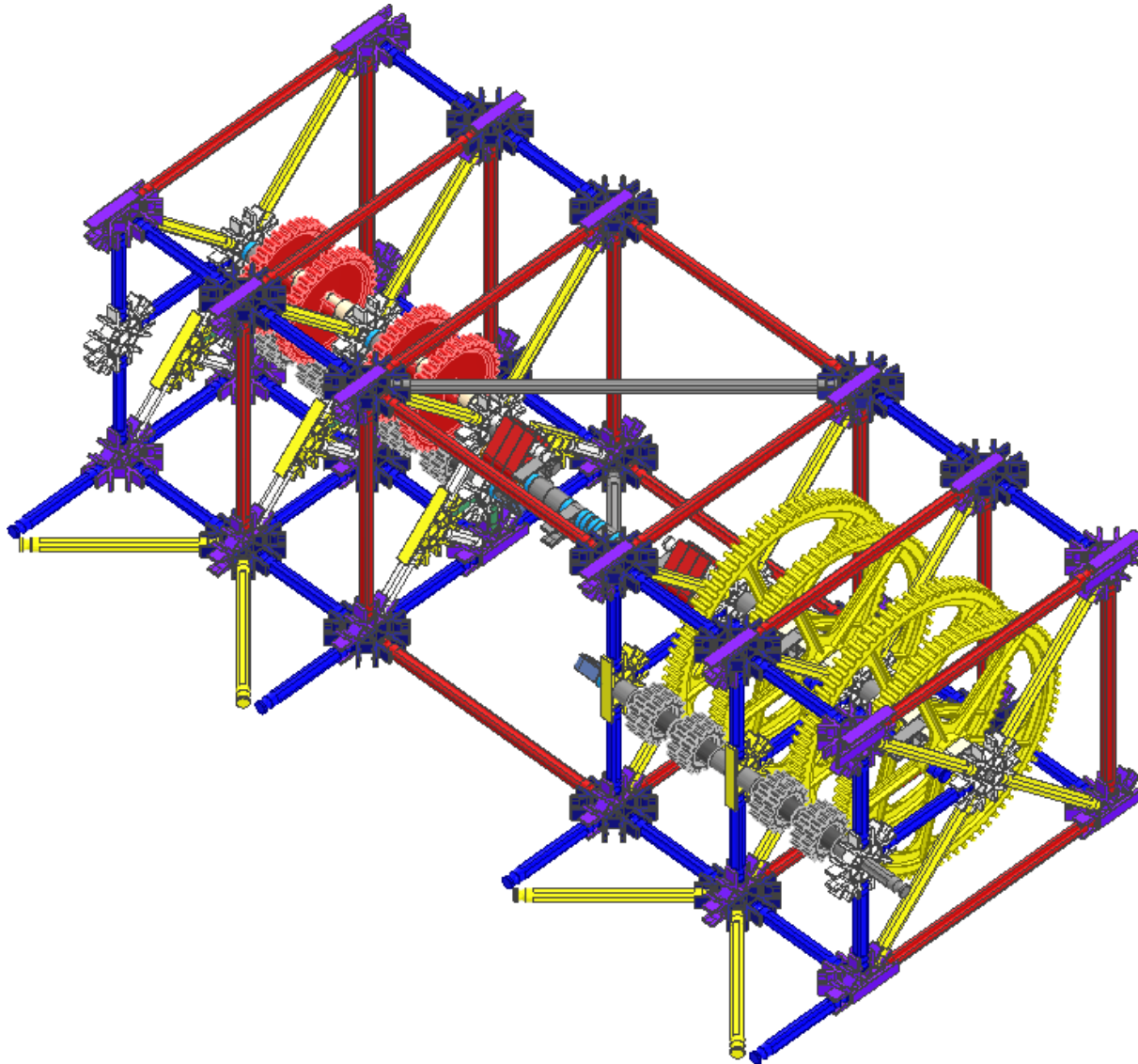
Insert cart into track



Note location of crank connection

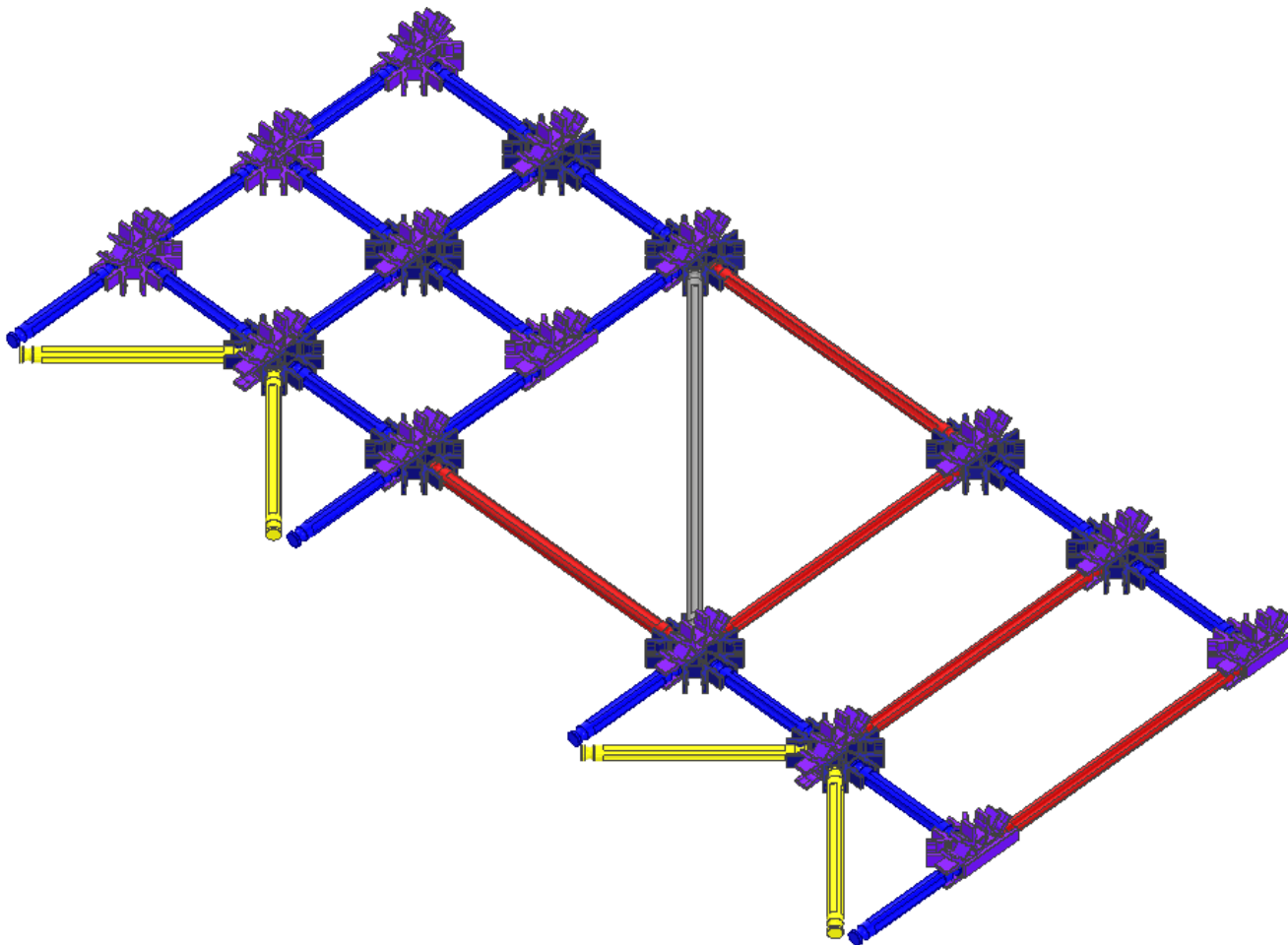


Part D: Gear Box



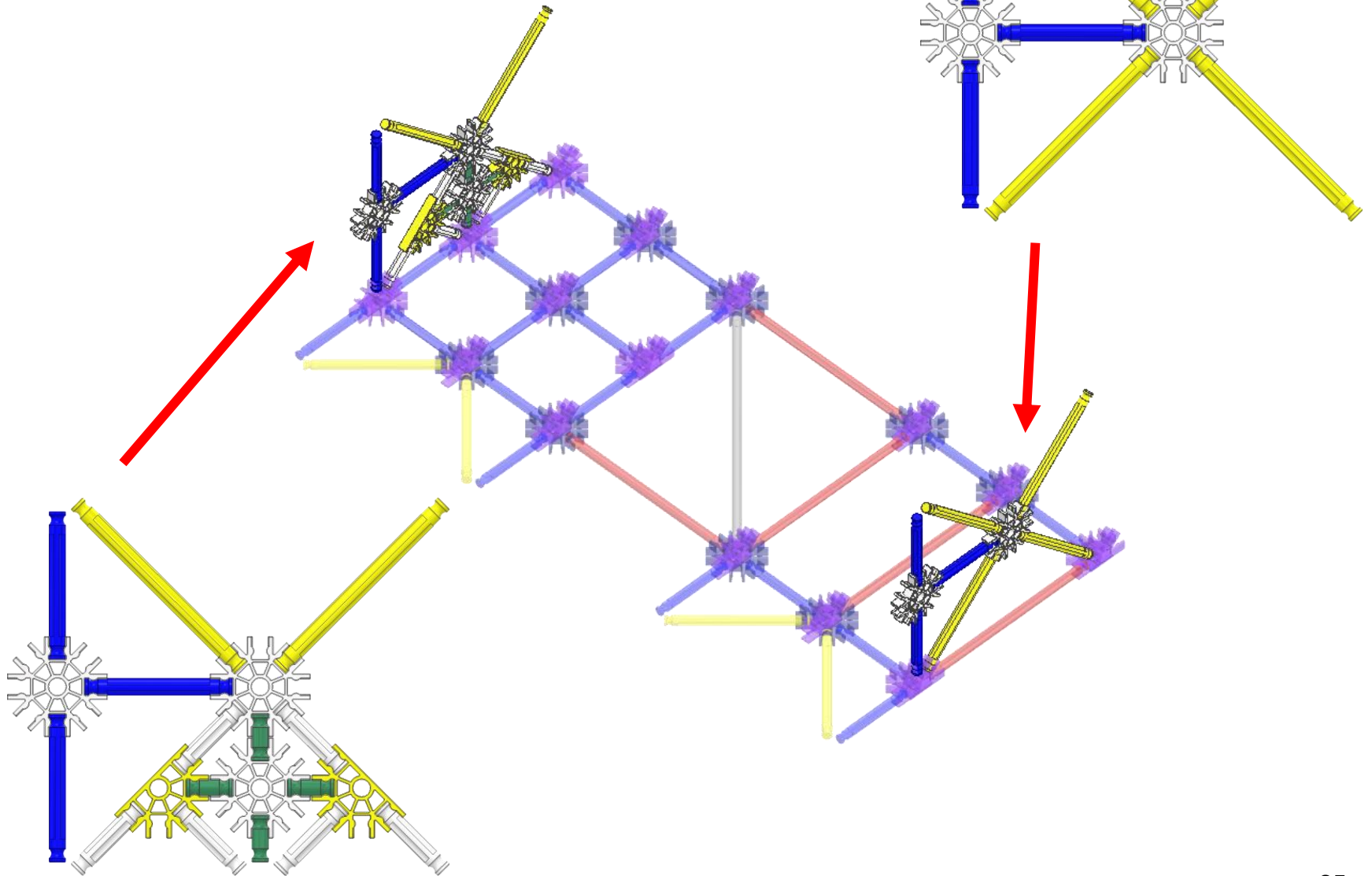
D1

Build base



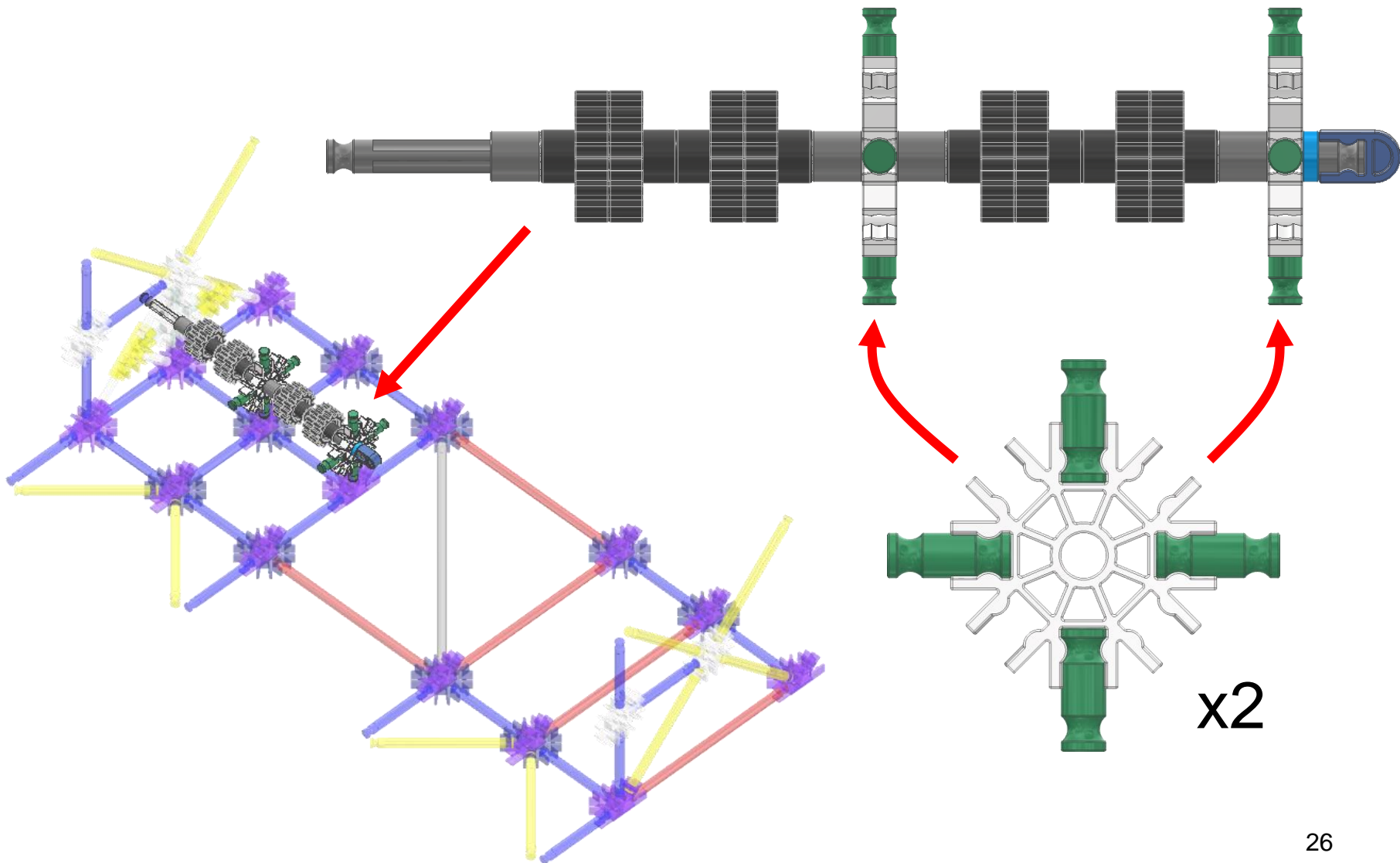
D2

Build and attach gear assembly guides



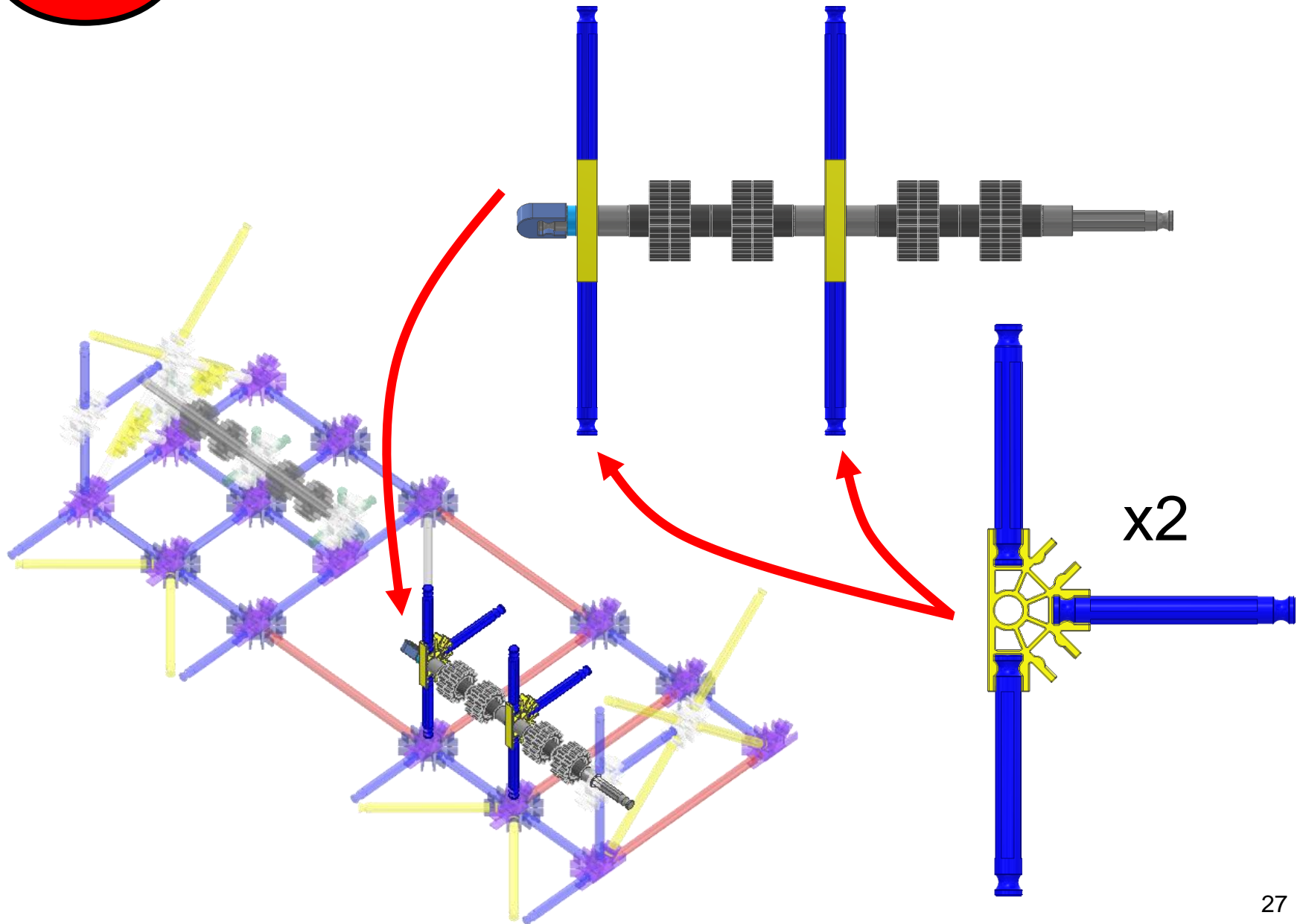
D3

Build and install high-gear drive



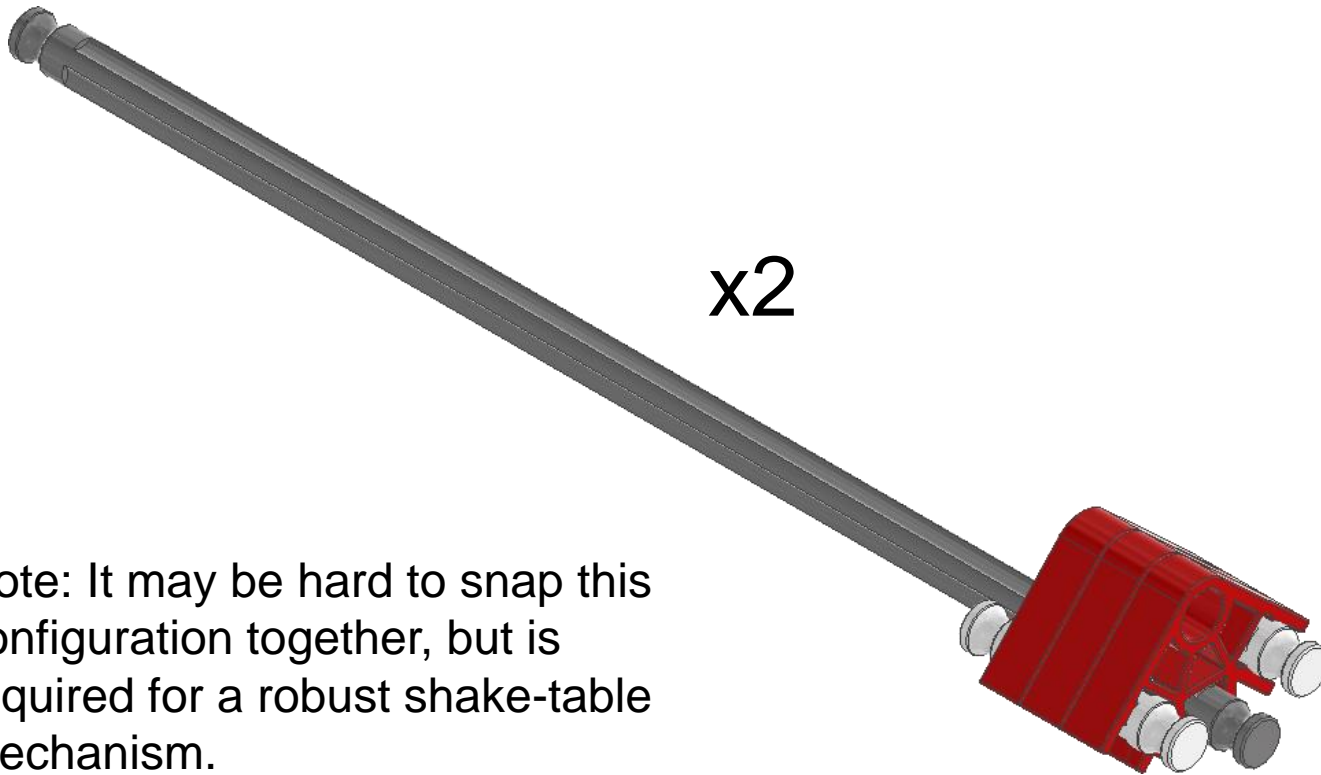
D4

Build and install low-gear drive



D5

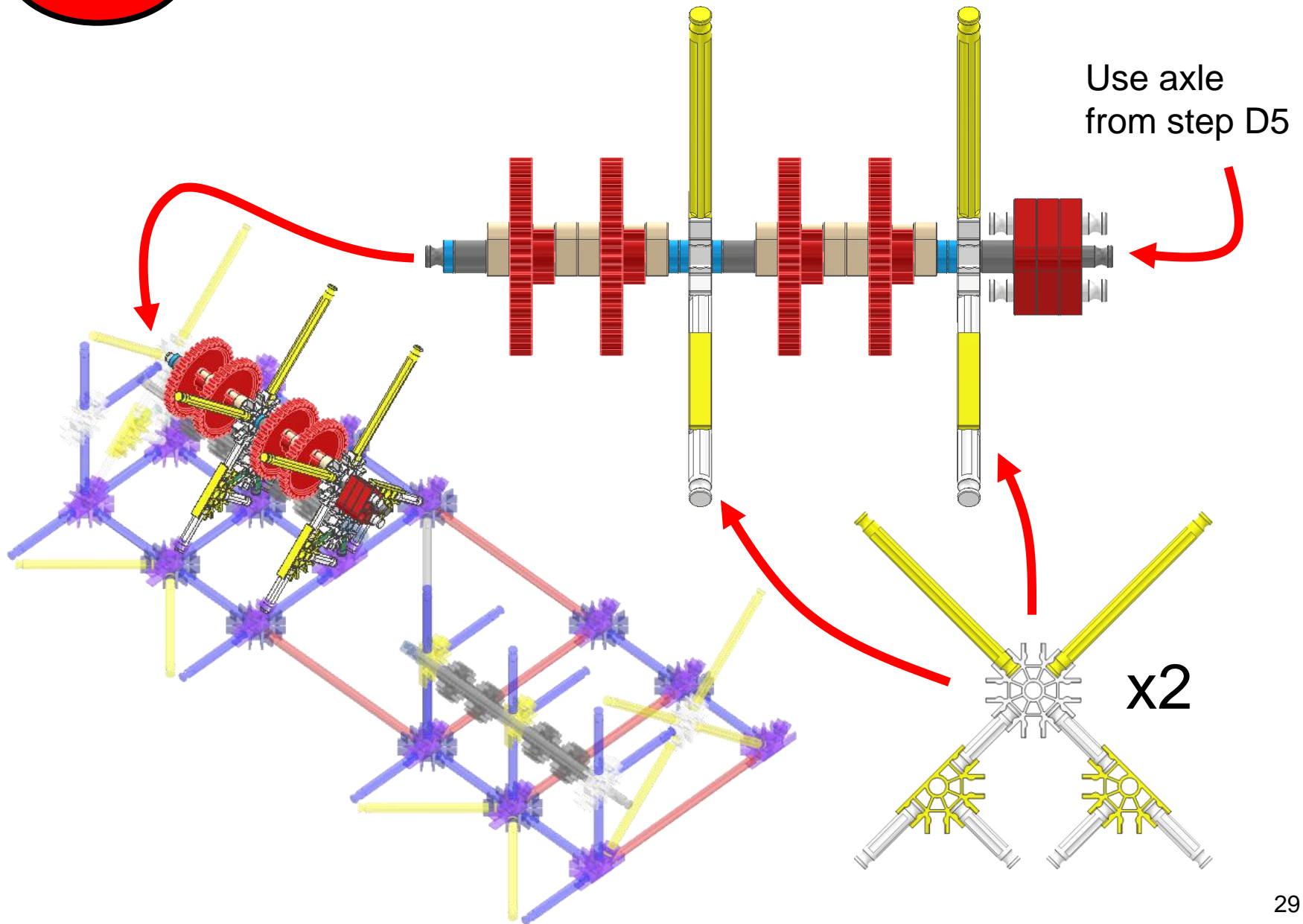
Build red and yellow gear assembly axles



Note: It may be hard to snap this configuration together, but is required for a robust shake-table mechanism.

D6

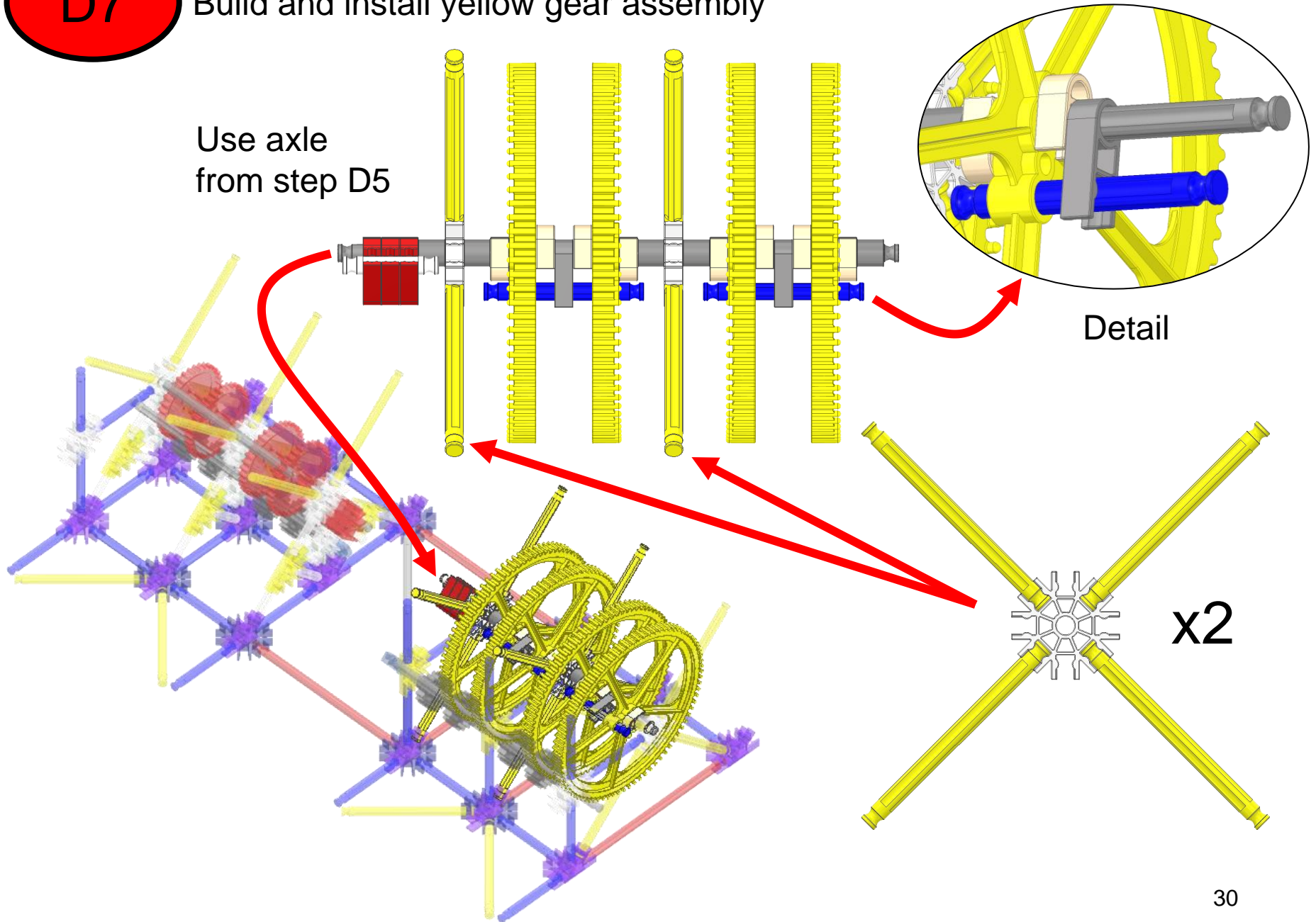
Build and install red gear assembly



D7

Build and install yellow gear assembly

Use axle
from step D5

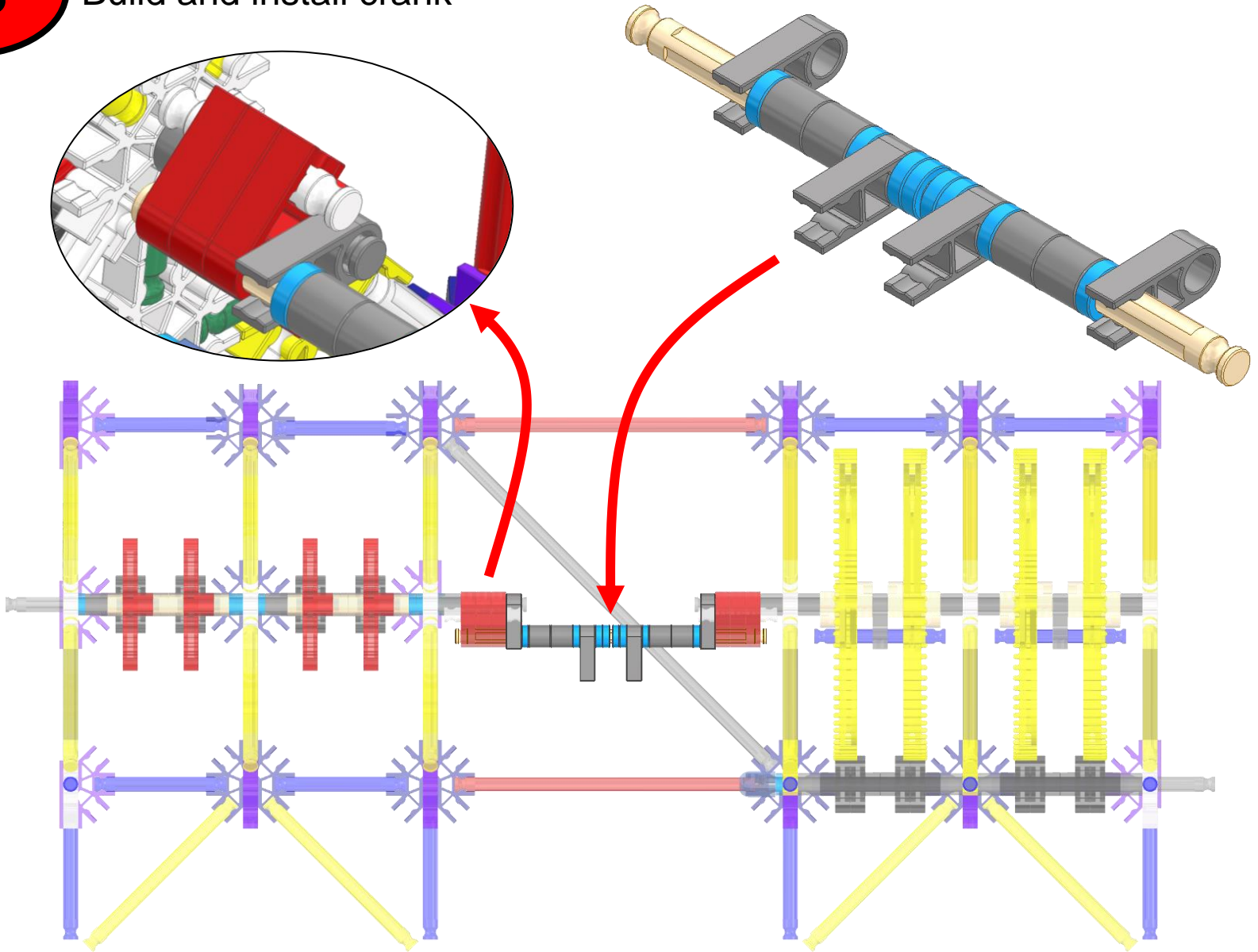


Detail

x2

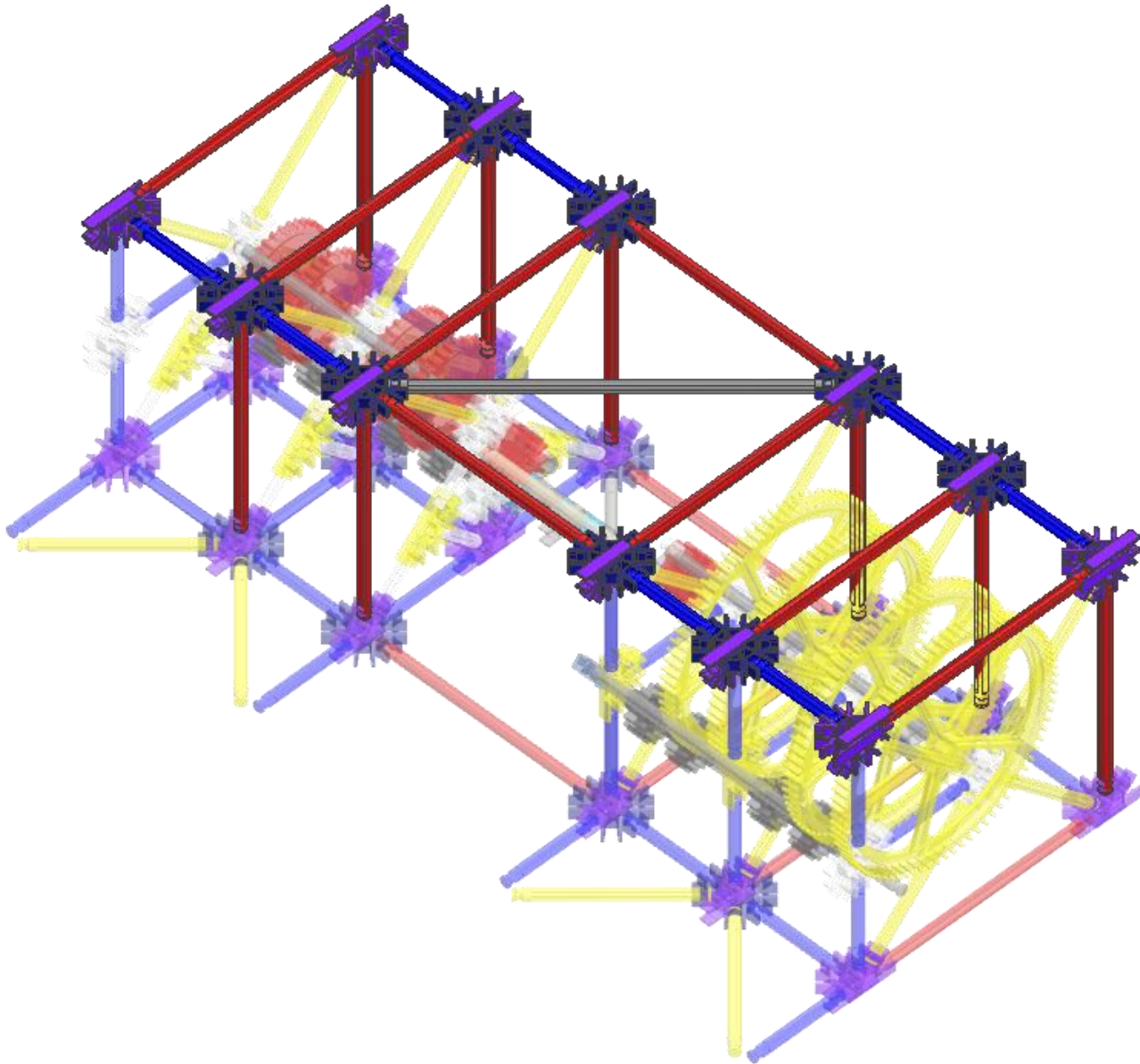
D8

Build and install crank



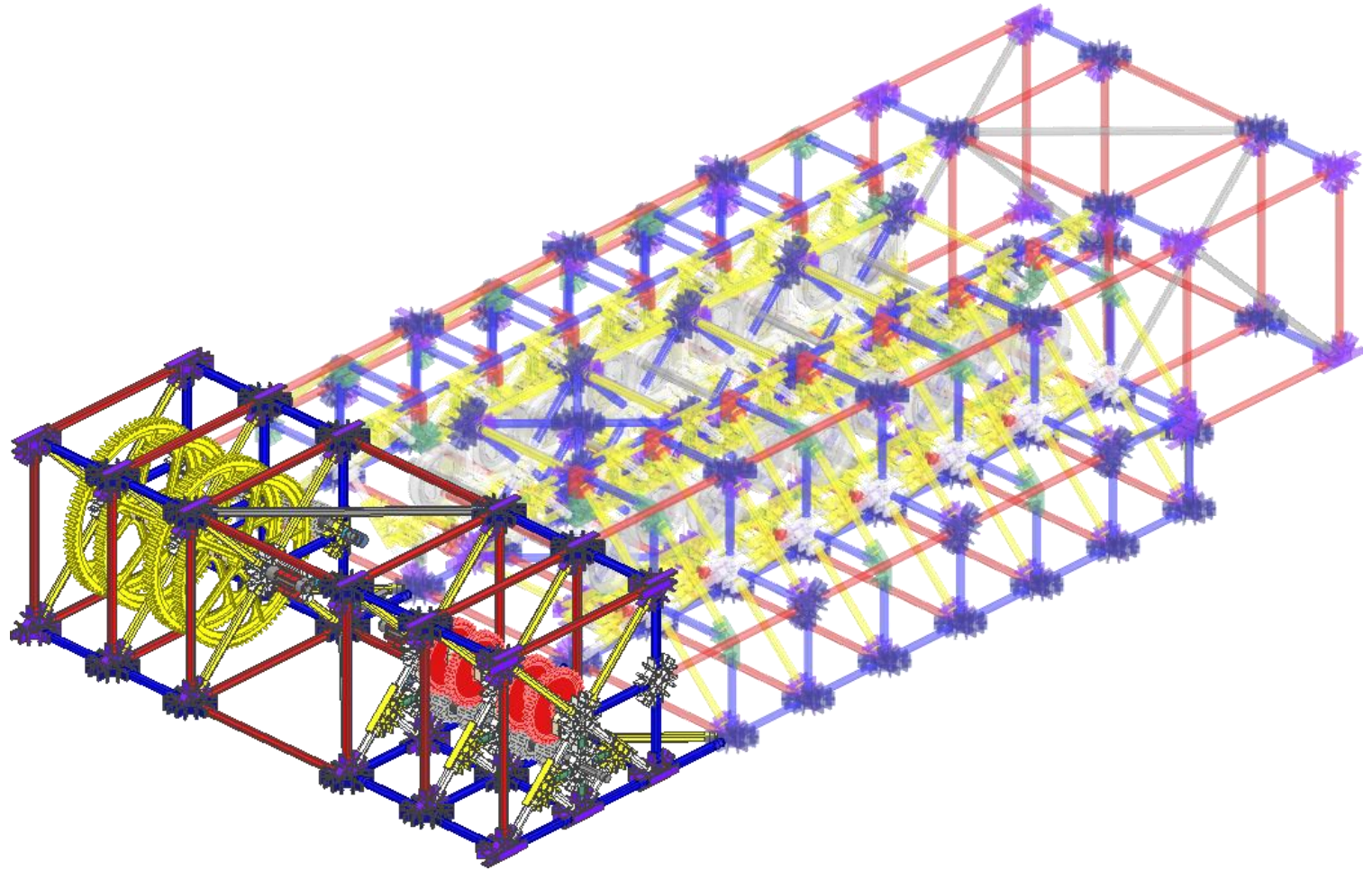
D9

Build and install gear box cover



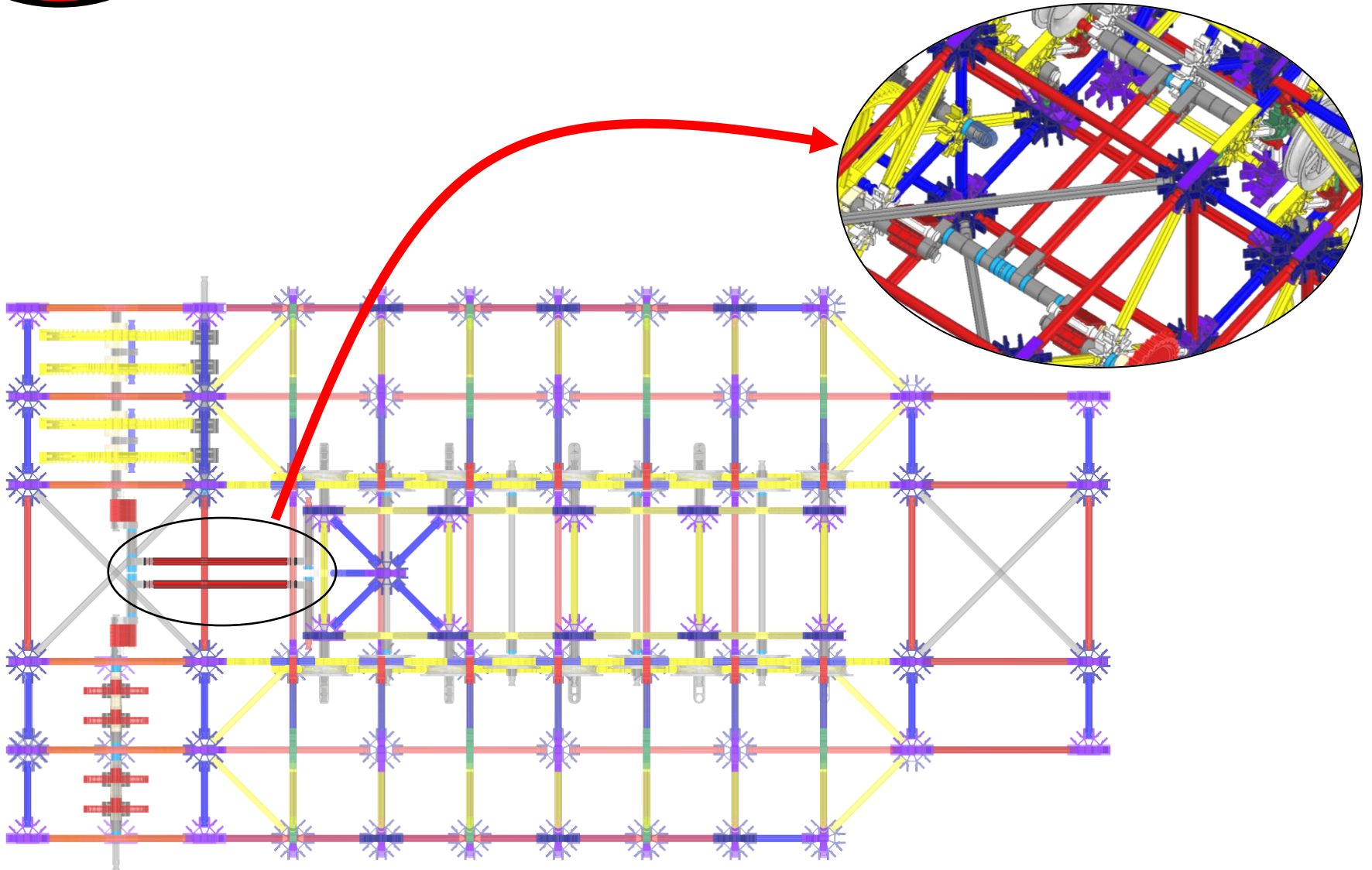
D10

Attach gear box to track

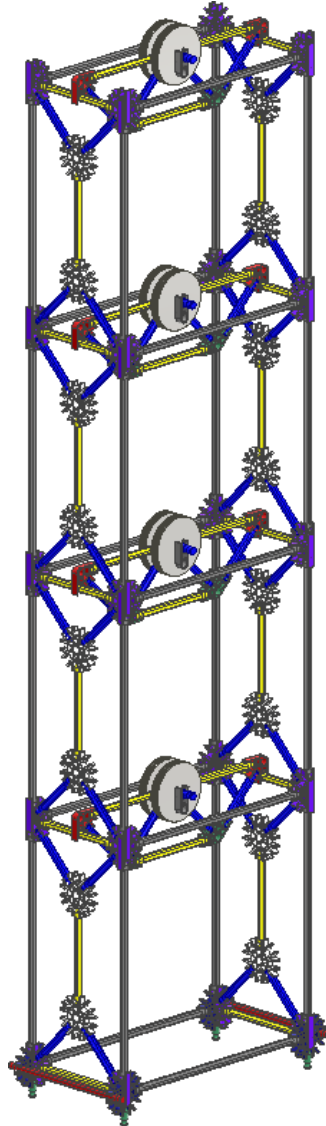


D11

Attach connecting rods for crank mechanism

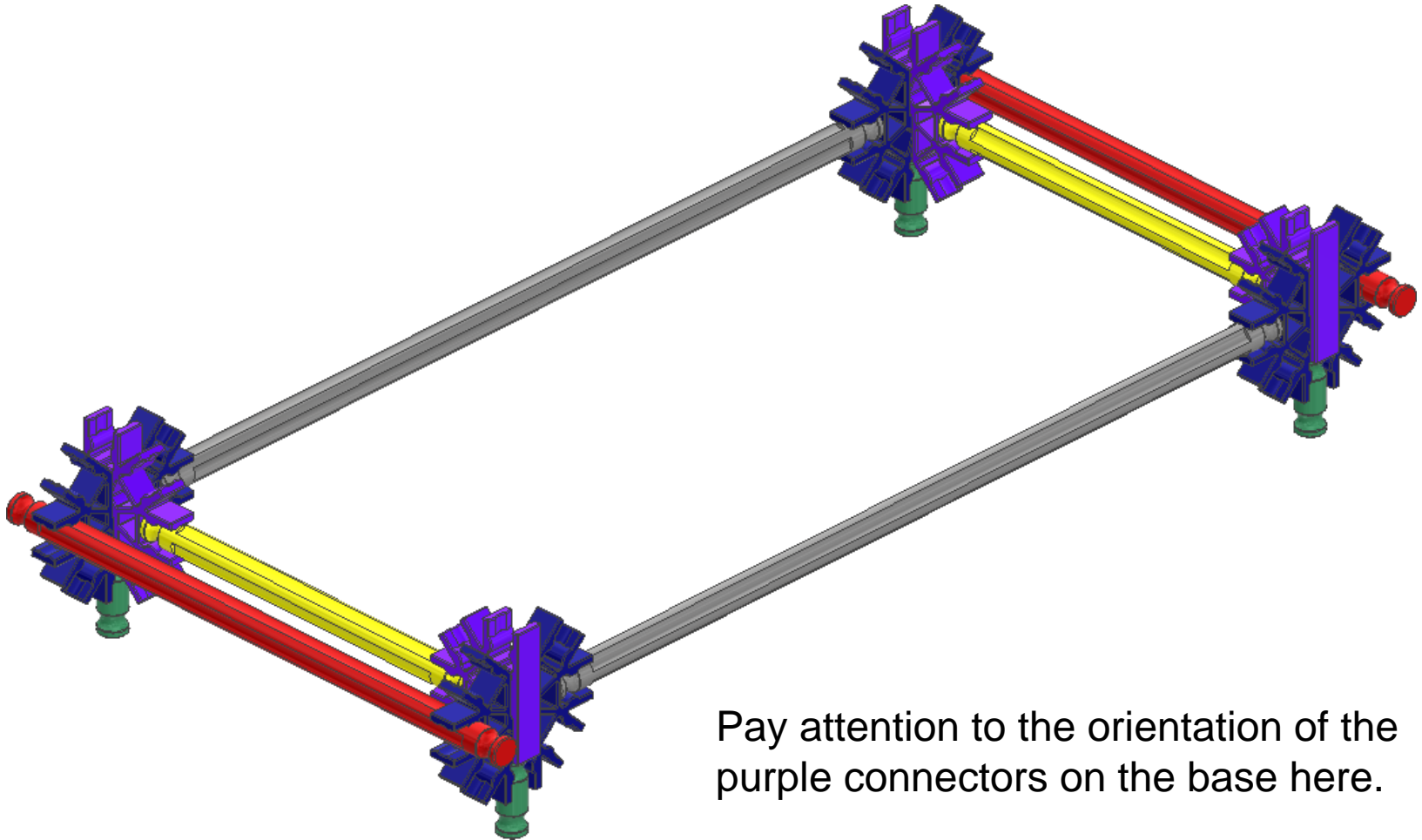


Part E: Tower



E1

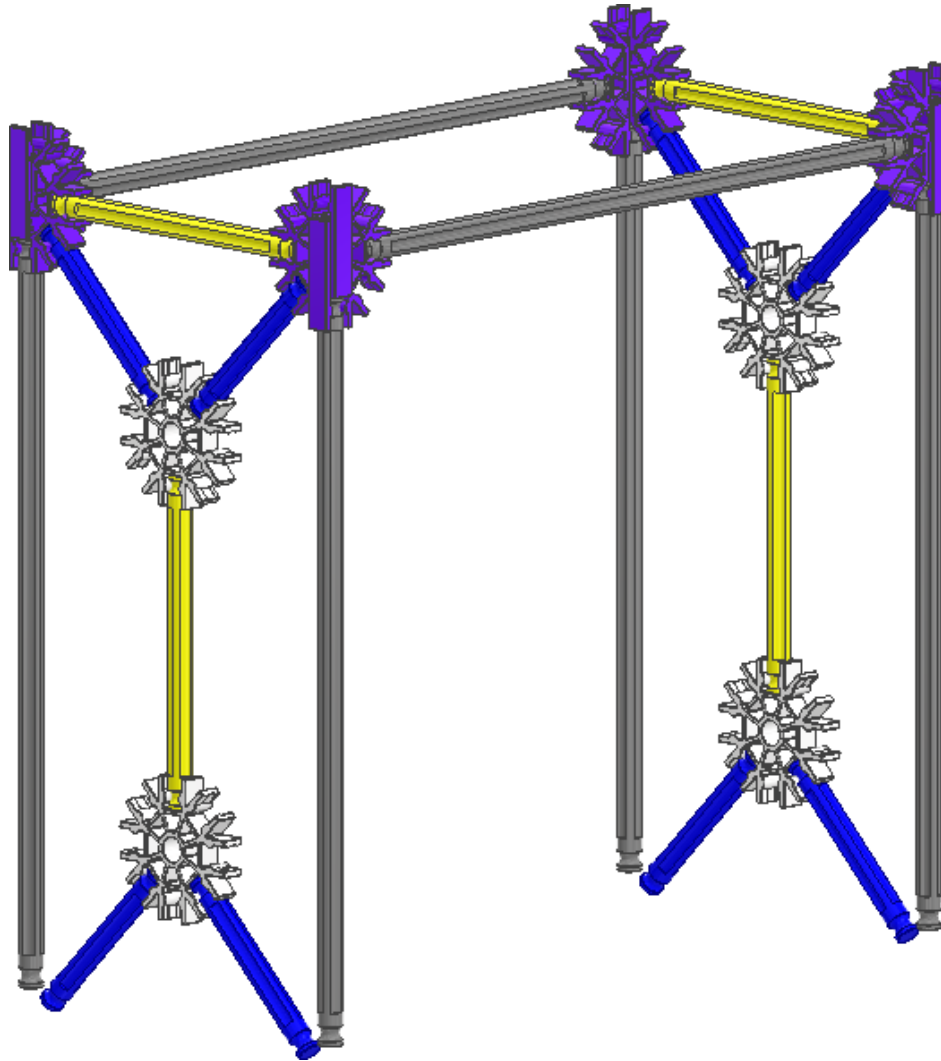
Build tower base



Pay attention to the orientation of the purple connectors on the base here.

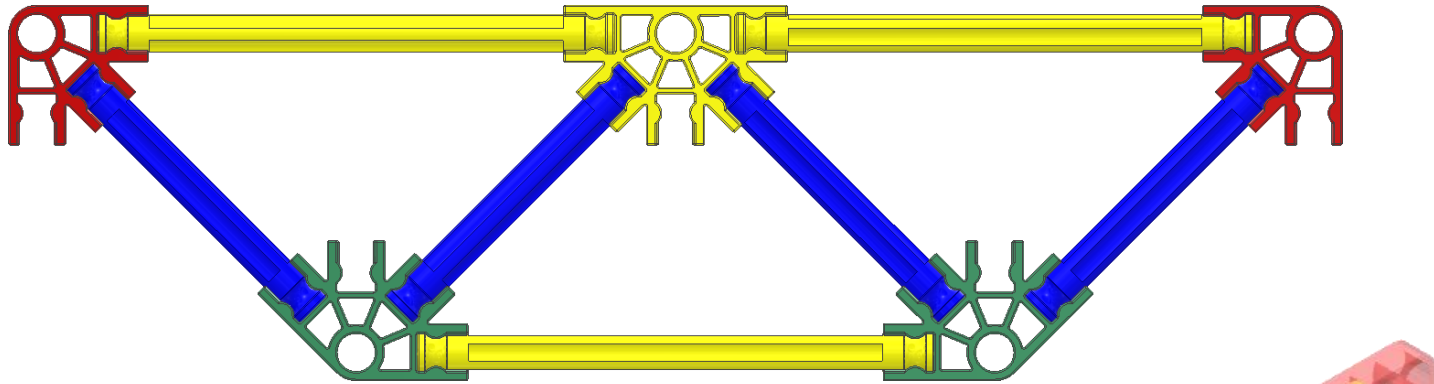
E2

Build frame(s) for tower levels

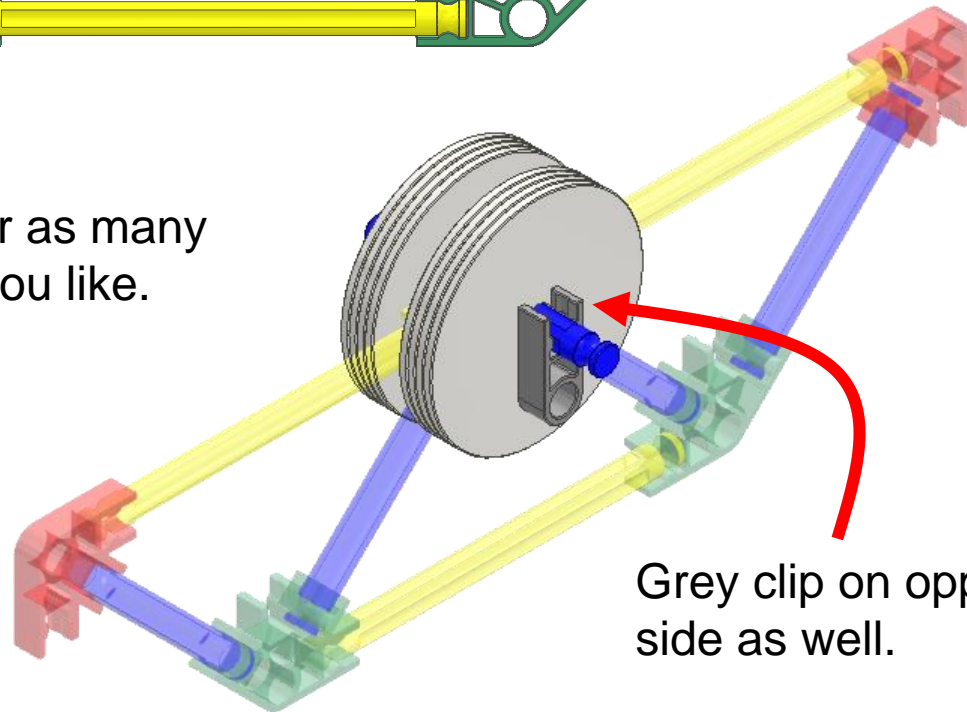


E3

Build hangar(s) for masses and attach masses



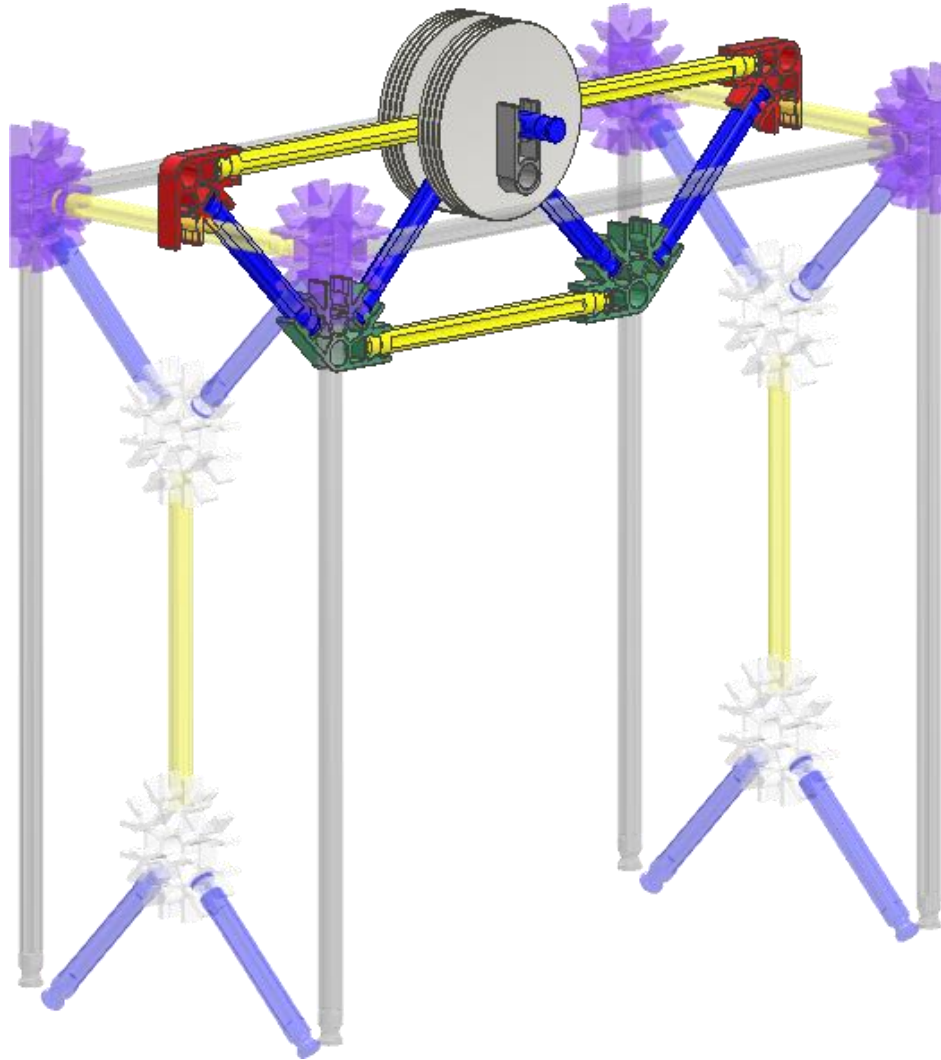
Add as few or as many washers as you like.



Grey clip on opposite side as well.

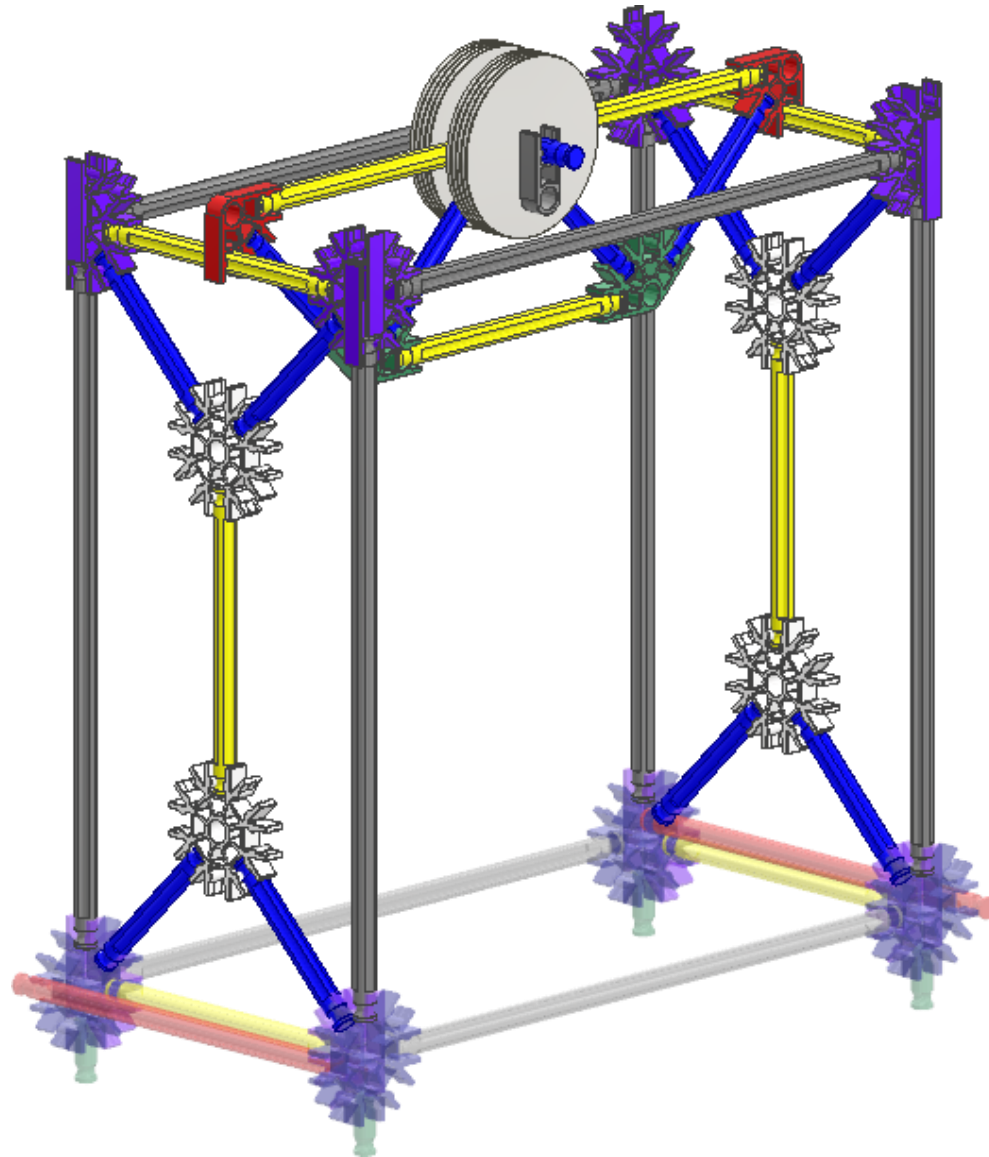
E4

Install mass hangars



E5

Attach first floor to base

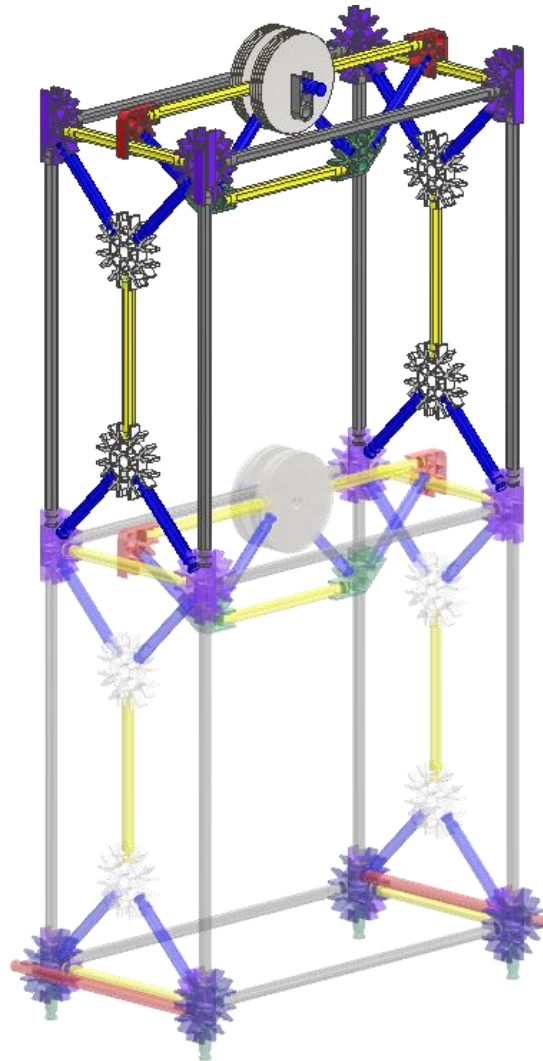


E6

Attach additional floors

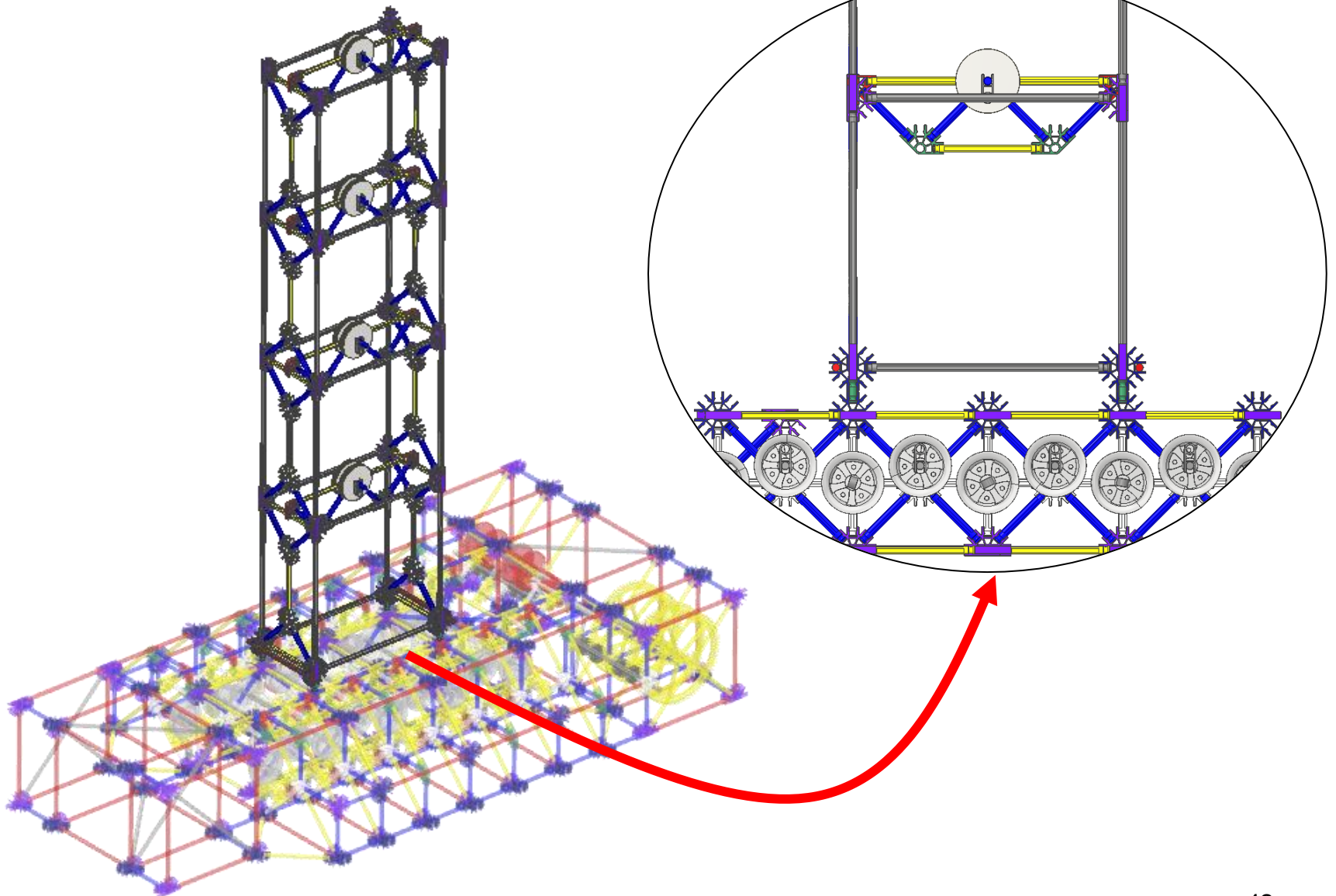
For taller buildings,
just add more levels.

Also, feel free to
experiment with
different types of
bracing systems!



E7

Attach tower to cart



Operation of shake table:

Attach drill to grey rods on either side of shake table.

Make sure to wear safety glasses!



Low-gear

High-gear

