Introduction to Augmented Reality for Teaching and Learning

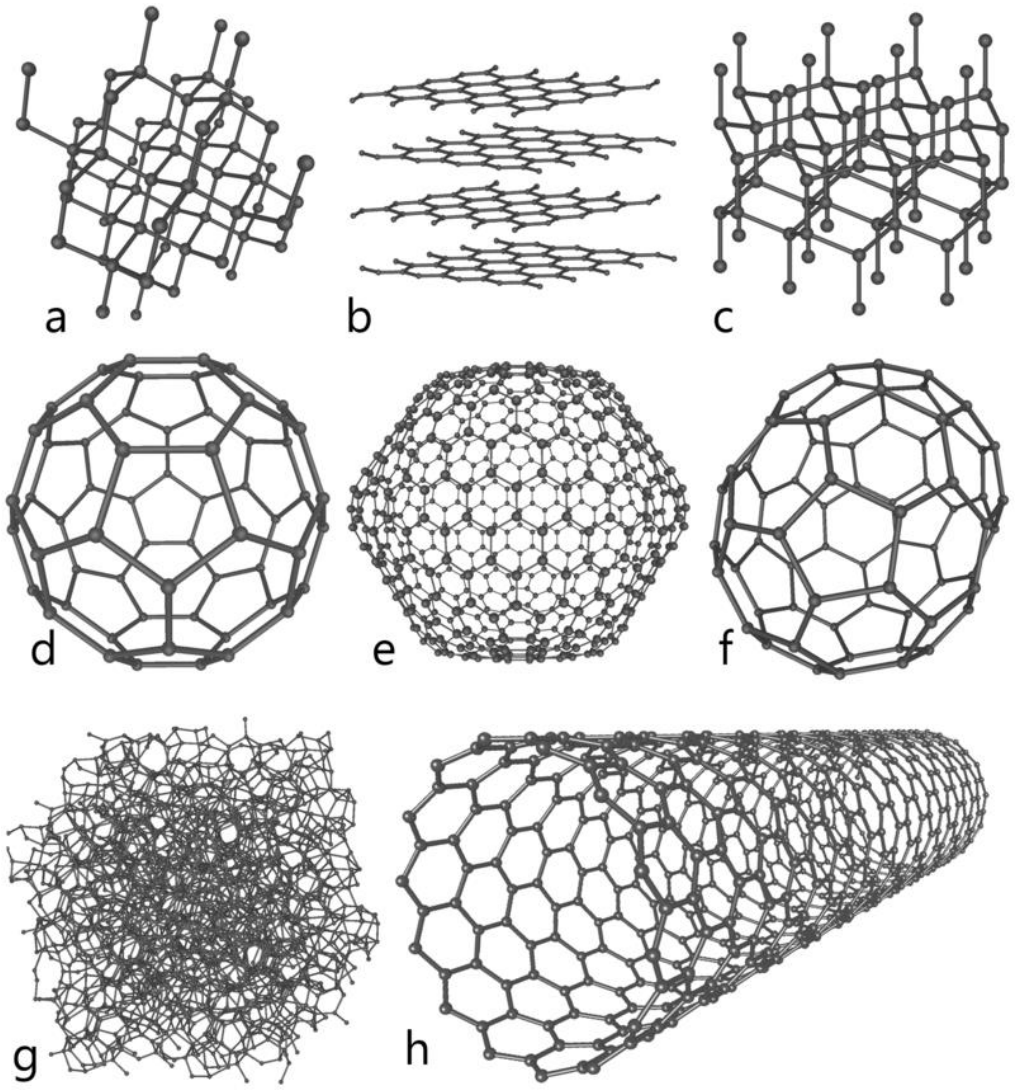
November 29, 2018.

The following activities are examples of how to use the AR technology in your teaching and learning. All of them require the installation of the free "Augment" App.

1-Augmented Reality Activity

Understanding Carbon Allotropes

Carbon is capable of forming many allotropes due to its valency. Well-known forms of carbon include diamond and graphite. In recent decades many more allotropes have been discovered and researched including ball shapes such as buckminsterfullerene and sheets such as graphene. Larger scale structures of carbon include nanotubes, nanobuds and nanoribbons.



Eight allotropes of carbon: a) diamond, b) graphite, c) lonsdaleite, d) C_{60} buckminsterfullerene, e) C_{540}, Fullerite f) C_{70}, g) amorphous carbon, and h) single-walled carbon nanotube.

Source and More info: https://en.wikipedia.org/wiki/Carbon_nanotube

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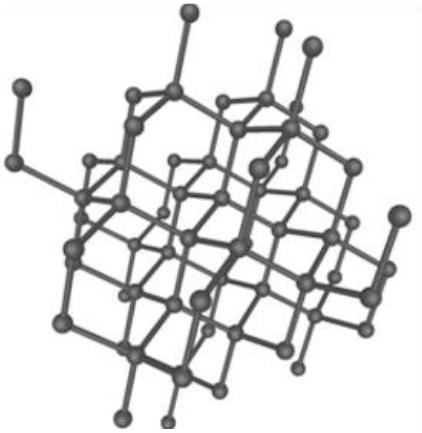
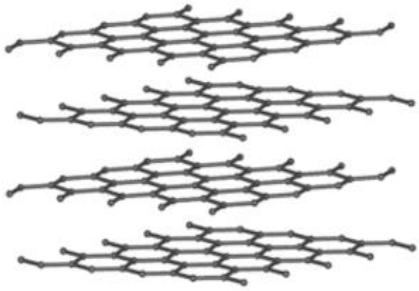
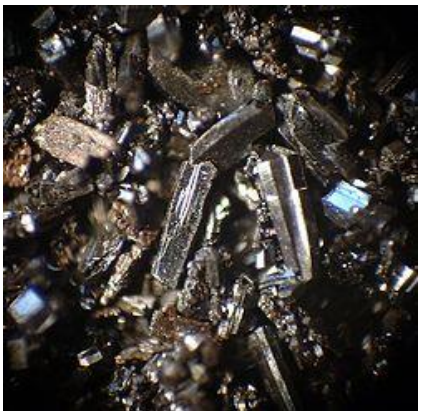
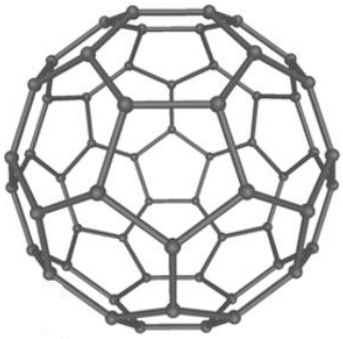
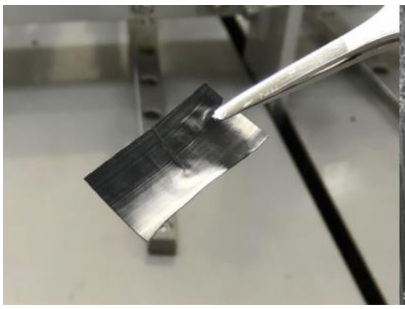
Scan the code with Augment and examine the allotrope in your hand!

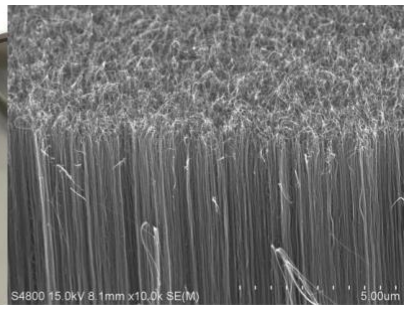


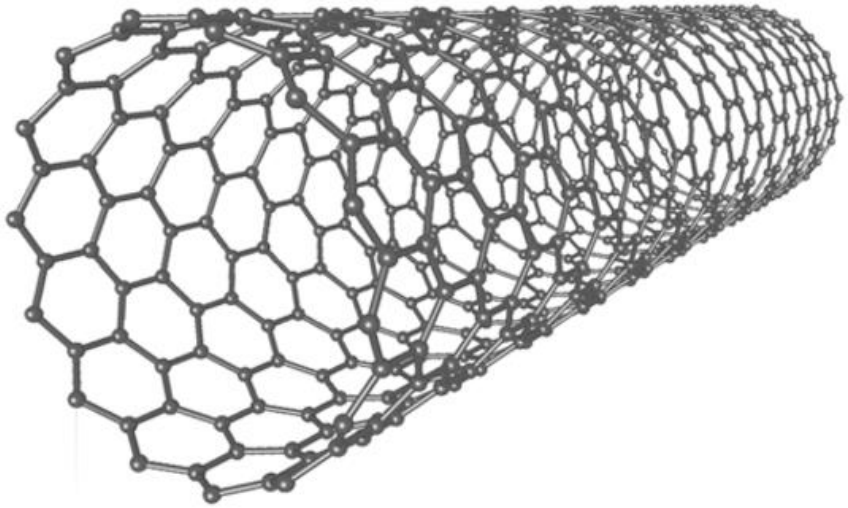












2-Augmented Reality Activity

Understanding Surfaces & Math

The Möbius strip or Möbius band, also spelled Mobius or Moebius, is a surface with only one side and only one boundary. The Möbius strip has the mathematical property of being unorientable. It can be realized as a ruled surface. Its discovery is attributed to the German mathematicians August Ferdinand Möbius and Johann Benedict Listing in 1858, through a structure similar to the Möbius strip can be seen in Roman mosaics dated circa 200–250 AD.

"If an ant were to crawl along the full length of the strip, it would return to its starting point having traversed both sides without ever crossing an edge"

- More info:

- Virtual in your hand → scan the code with Augment!

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- Build it yourself:

3-Augmented Reality Activity

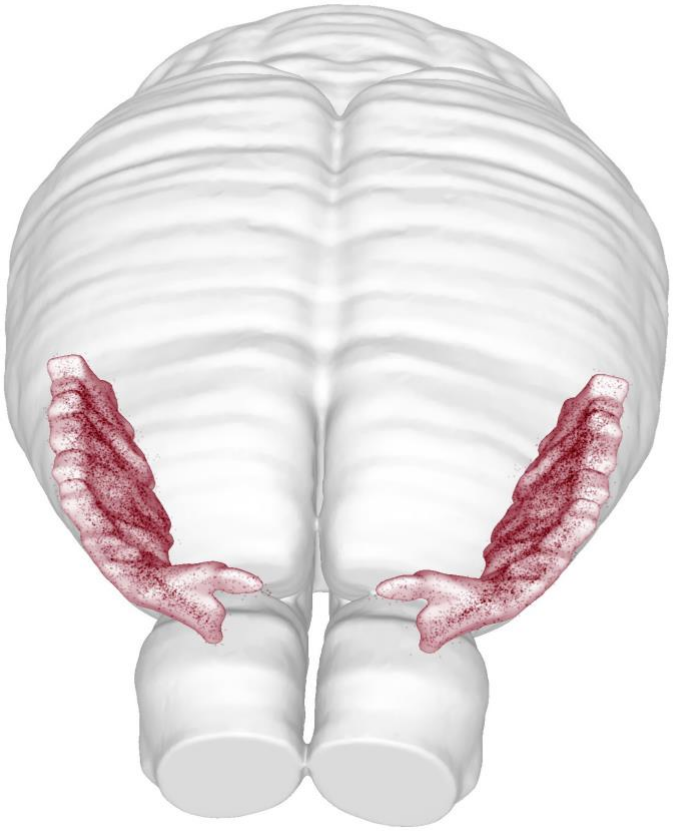
Understanding Virus, symmetry, 3D Structure (see zika.pdf file)

Read the attached material, anytime you see the Augment logo:

Scan the code or use the app to get and augmented visualization.

4-Augmented Reality Activity

Olfactory Areas: Piriform areas



Source: https://bbp.epfl.ch/nexus/cell-atlas/

Front. Neuroinform., 28 November 2018 | https://doi.org/10.3389/fninf.2018.00084

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5-Augmented Reality Activity

Drugs, Chemistry & Stereochemistry

- **Ibuprofen** is a medication in the nonsteroidal anti-inflammatory drug (NSAID) class that is used for treating pain, fever, and inflammation.

- **Ibuprofen** is a chemical compound which formula is $C_{13}H_{18}O_2$ and chemical name:

(RS)-2-(4-(2-Methylpropyl)phenyl)propanoic acid

Scan the QR code using the Augment App to load the ibuprofen molecule and identify the different chemical moieties.

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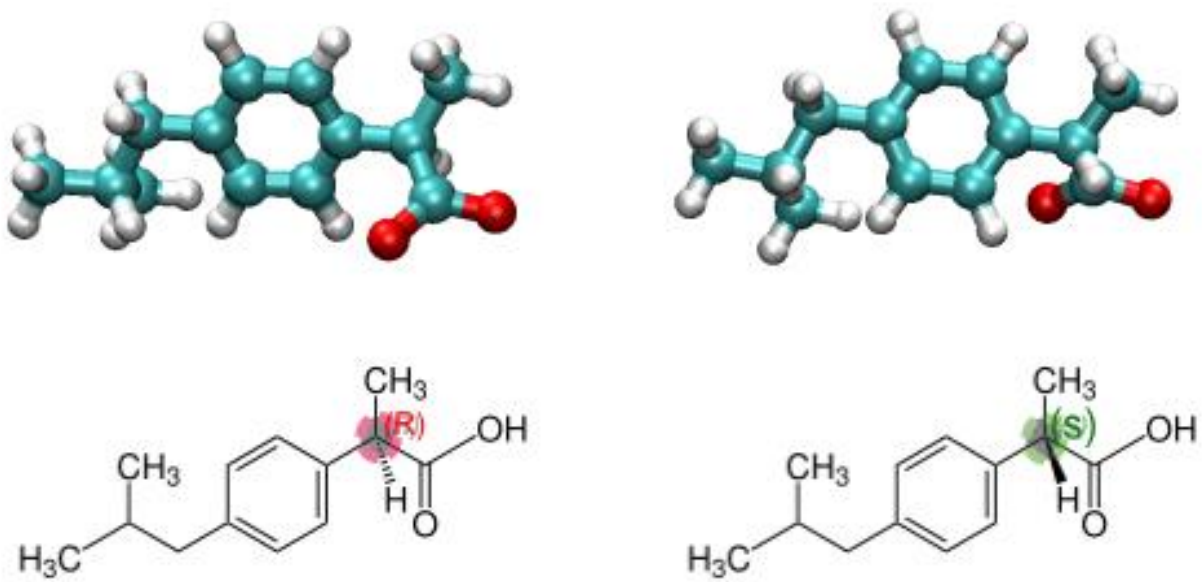
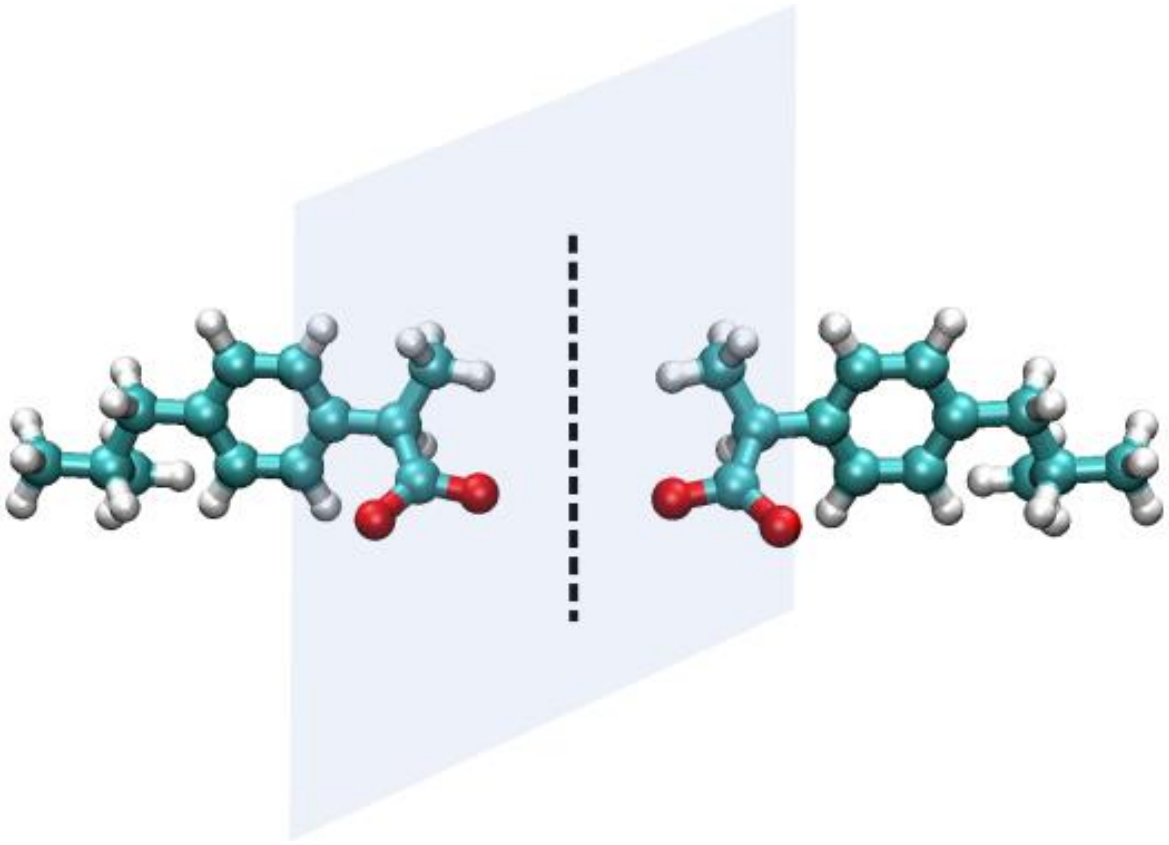
- **Ibuprofen** It is an optically active compound with both *S* and *R*-isomers, of which the *S* (dextrorotatory) isomer is the more biologically active. Ibuprofen is produced industrially as a racemate. The compound, does contain a stereocenter in the α-position of the propionate moiety. So two enantiomers of ibuprofen occur, with the potential for different biological effects and metabolism for each enantiomer.

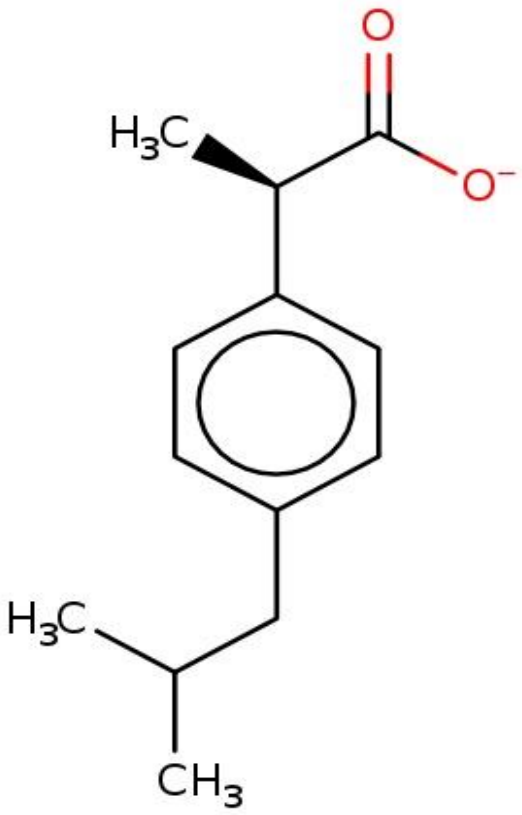
Using the Augment App identify which isomer do you have in your hand.



An isomerase (alpha-methylacyl-CoA racemase) converts (*R*)-ibuprofen to the active (*S*)-enantiomer.

http://www.rcsb.org/pdb/results/results.do?tabtoshow=Current&qrid=E155D4F3





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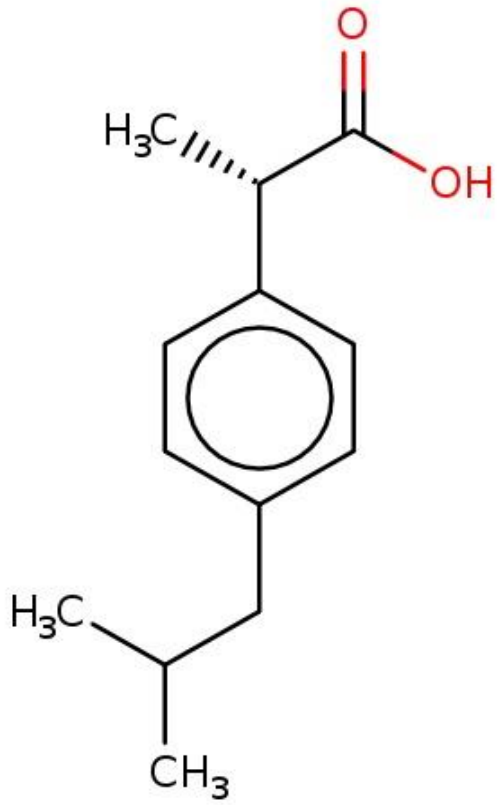

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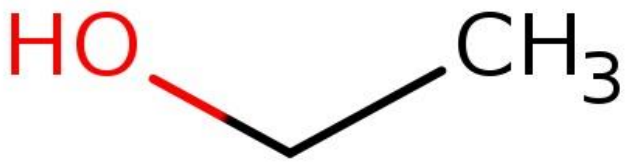
6-Augmented Reality Activity

Virtual Molecules and Physical models



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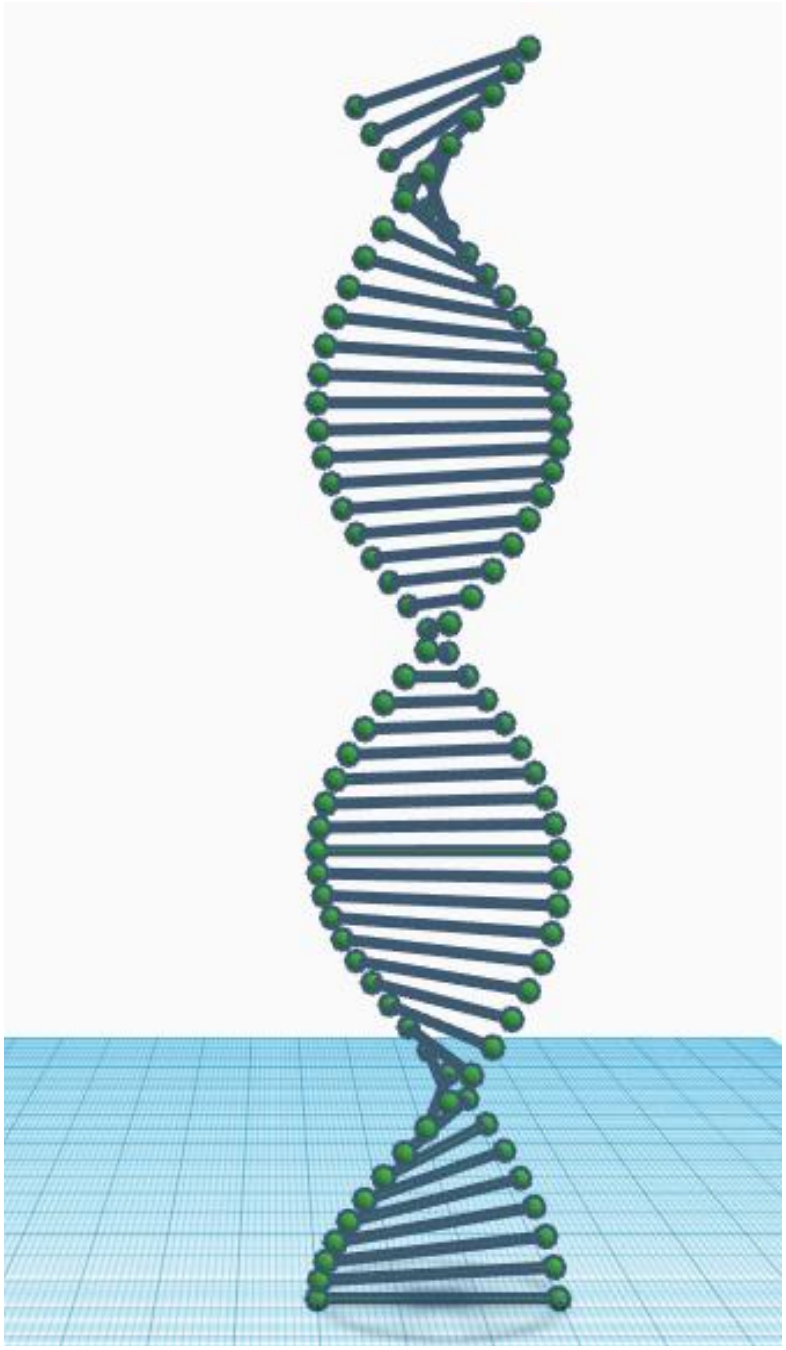
7-Augmented Reality Activity

3D shapes & Art



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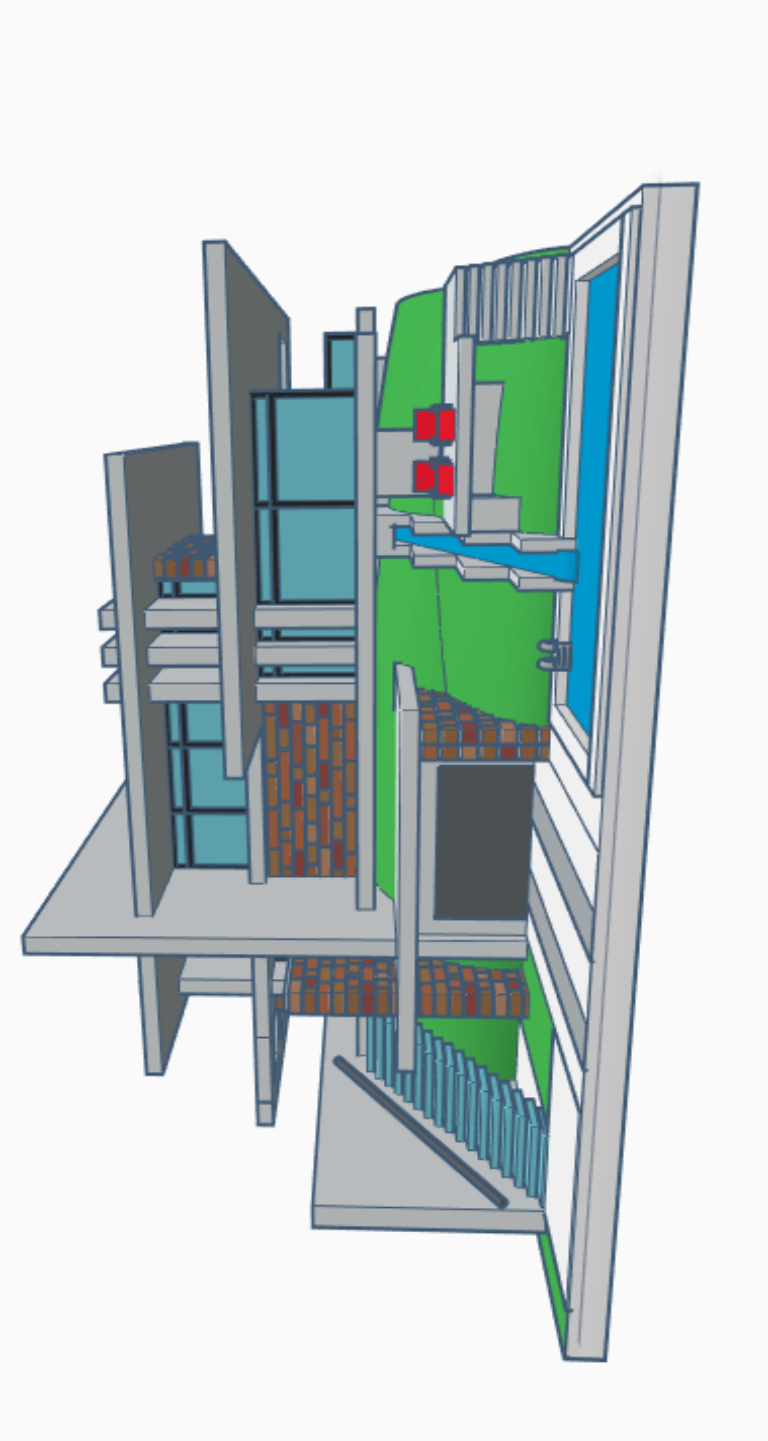
8-Augmented Reality Activity

House Prototype



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9-Augmented Reality Activity

3D Shapes

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Cube

Tetrahedron

Icosahedron

10-Augmented Reality Activity
History/Architecture/Art

Eim ya kyaung Temple

The Eim ya-kyaung temple is located East of Old Bagan, 300 meters west from the much larger Hitlominlo Temple. Of the thousands of monuments in Pagan, Eim ya kyaung nga-myet hna is one of only sixteen that have been identified with a pentagonal plan. The temple and associated monastery (Monument 1832) are located within a walled enclosure.

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Caracol - Chichén Itzá

One of Chichén Itzá's most well-known structures is the Caracol. The Caracol is one of the oldest standing observatories in the Americas, and highlights the great importance that astrological phenomena held for the Maya.

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