

## A teacher's kit of 3D printed models

→ You can find the .stl files for the models on <https://math.uni.lu/helix>.

### Minimal kit contents (*Minimal\_kit.3mf*)

- $2 \times$  right-handed helices (in two different colours, e.g., black and white) (*Helix\_right\_handed.stl*)
- $1 \times$  left-handed helix (with the same radius, pitch, and height as the right-handed version) (*Helix\_left\_handed.stl*)
- (Optional)  $1 \times$  cylinder of the same radius as the other helix models. (*Helix\_Cylinder.stl*)
- (Optional)  $1 \times$  cylinder with an external thread which is compatible with the left-handed helix. (*Cylinder\_external\_thread.stl*)



Figure 8: The content of the Minimal Teacher's Kit

### General demonstrations:

- Illustrate the general shape of a cylindrical helix. Optionally, use the cylinder to show the radius of the helix.
- Highlight handedness by comparing the left- and right-handed versions.
- Form a longer helix by combining two helices of the same handedness.



## Double helix:

### Tricks to form a double helix:

- Put one helix around one of your fingers (e.g. your left thumb if you are right-handed) to keep it in place. Then "screw" the other helix in.
- Use the (optional) cylinder: Place one helix in the cylinder, then screw the other in.



### Demonstrations:

- Show that both "single" helices are identical by placing them side by side.
- Show that one helix can be obtained from the other by
  - a rotation of  $180^\circ$  around the cylinder's axis.
  - a translation of half the pitch.
- Show that a helix fits on a cylinder with an external helical thread of the same parameters as the helix.



One is a rotation of the other.



One is a translation of the other.



A helix on a cylinder with external thread.

## Additional models

- A marshmallow helix which consists of four single helix strands of the same parameters.  
(*Marshmallow.stl*)

### Additionally:

- A cylinder for easier assembly.  
(*Marshmallow\_Cylinder.stl*)
- A middle part to hold everything together and (optionally) create a key chain.  
(*Marshmallow\_keychain.stl*)

