 Exponential growth and paper folding

Activity:

1. Ask the question: ‘Can folding a piece of paper 45 times get you to the moon?’ Ask for students opinions.
2. Create a table of values and start with 0 folds giving a thickness of 1 layer of paper, 1 fold giving a thickness of 2 layers, 2 folds giving a thickness of 4 layers, along with the measured thickness (they can fill this in later)

| Folds | Thickness (number of layers) | Actual thickness (cm) |
| --- | --- | --- |
| 0 | 1 |       |
| 1 | 2 |       |
| 2 | 4 |       |
| 3 | … |       |
| 4 |       |       |
| And so on |       |       |

1. Students draw the graph (by hand or by using a graphing program)
2. Students are to come up with an algebraic equation to relate the number of layers to the number of folds.
3. Have students predict how thick (number of layers) the paper would be after 45 folds.
4. Assuming the paper is 0.001cm thick initially, how thick will it be after 45 folds? (This thickness relates to the video linked below)
5. How close is this to the moon?
6. Is this model practical in real life? How many times can students fold a piece of paper?

[TED-Ed video](https://ed.ted.com/lessons/how-folding-paper-can-get-you-to-the-moon) to related to the activity.

[Current Paper Folding Record](https://www.sciencealert.com/a-piece-of-paper-folded-103-times-will-be-as-thick-as-the-universe): Information is based on a piece of paper 0.05mm or 0.005 cm thick