

1, 1, 2, 3, 5, 8, 13, 21, 34, 55

Fibonacci Numbers in Nature Lapbook/Notebook Templates



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Revised 12/28/16

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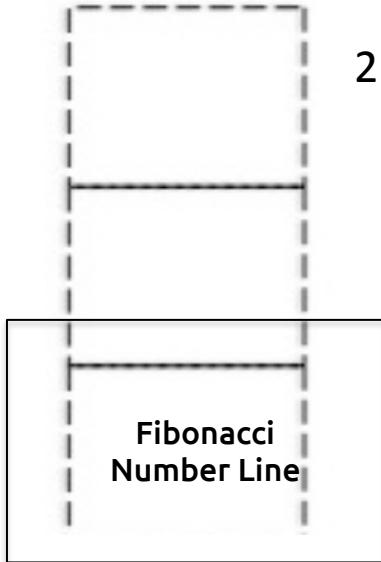
Fibonacci Number in Nature Lapbook/Notebook Templates Instructions

Instructions: Students can decide whether to use these templates as a lapbook or in an interactive notebook for this unit study. The template information corresponds with the PowerPoint lesson and specifically with the review/quiz questions as additional reinforcement. Therefore the answers can all be found within the PowerPoint.

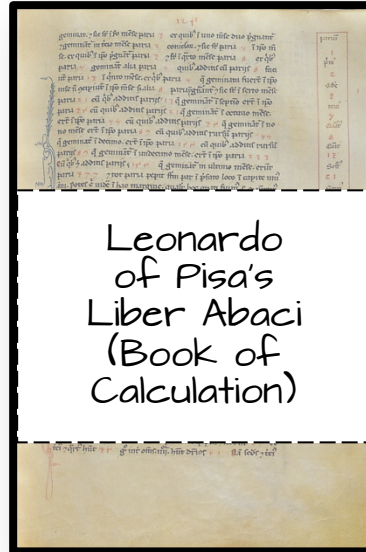
If students can't use a color printer, there are the black and white template options for printing. Students can refer to the color versions to color the black and white versions. For these templates, students are to cut along the dotted lines and fold on the dark lines. If students are coloring any of the images, it's suggested to first color any images before cutting out and gluing them to their surfaces. Follow additional instructions per template page on the following pages. Students can layout the image any way they want on their media of choice.

Students are also welcome to add more images than what is offered here to their lapbook or notebook.

1.



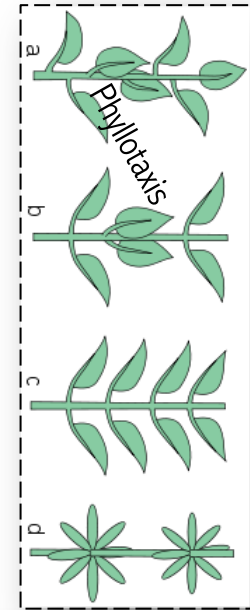
2.



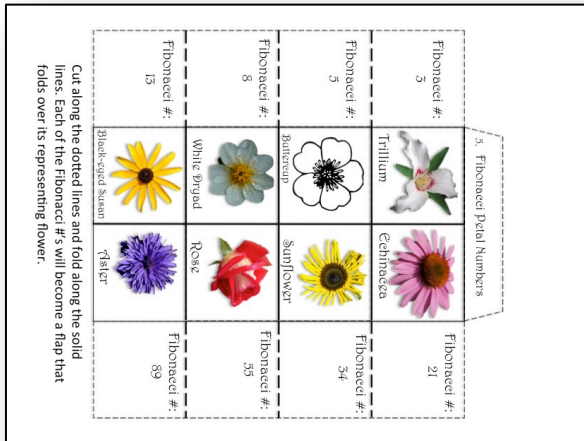
3.

The Fibonacci Numbers Relationship to Phi

4.



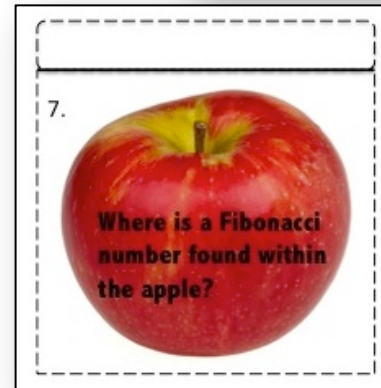
5.



6.



7.



This is a "map" of the templates. Students are at choice for how they want to lay their templates out on their media of choice.

1. The Fibonacci Number Line

0	1								
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--	--	--	--	--	--	--	--	--	--

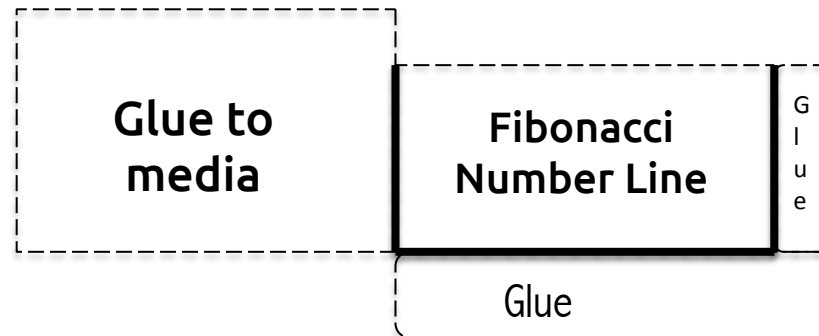
--	--	--	--	--	--	--	--	--	--

Write the Fibonacci number series up to 30 numbers in each square. You can either add the numbers yourself or use a resource to assist you with the answers. Each square gets its own number. The first two are done for you as an example.

Cut along the dotted lines, fold along the dark lines to make an accordion line. Students can optionally tape the ends together for one long line. Store in the mini pocket on the following page.

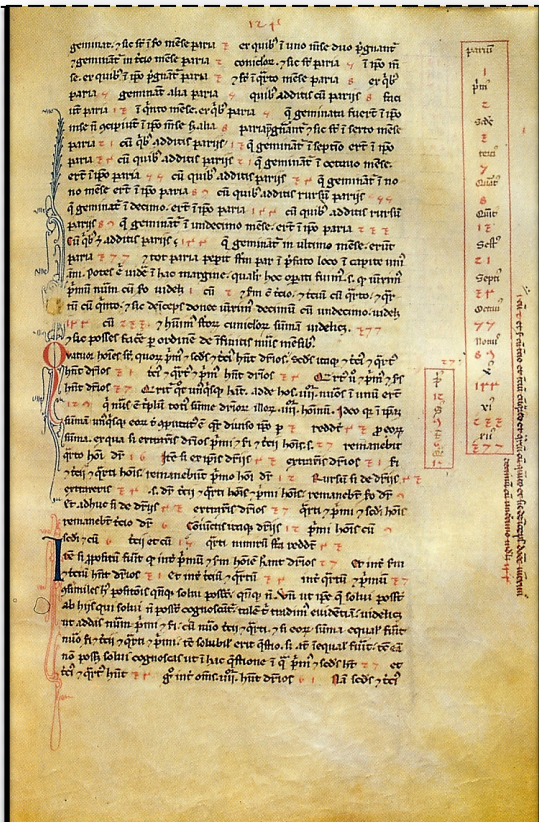
Fibonacci Number Line Mini Pocket

Cut along the dotted lines, fold along the dark lines. Fold the pocket so the title is showing on the outside. Slide your Fibonacci number time line into the pocket once the glue has dried.



2.

- Introduced _____ - _____ numerals (0 – 9) & place value to Europe
- 0-9 applied to commercial bookkeeping, weights conversion, measures, interest calculation, money-changing, and much more
- Reveals (in box on right) _____



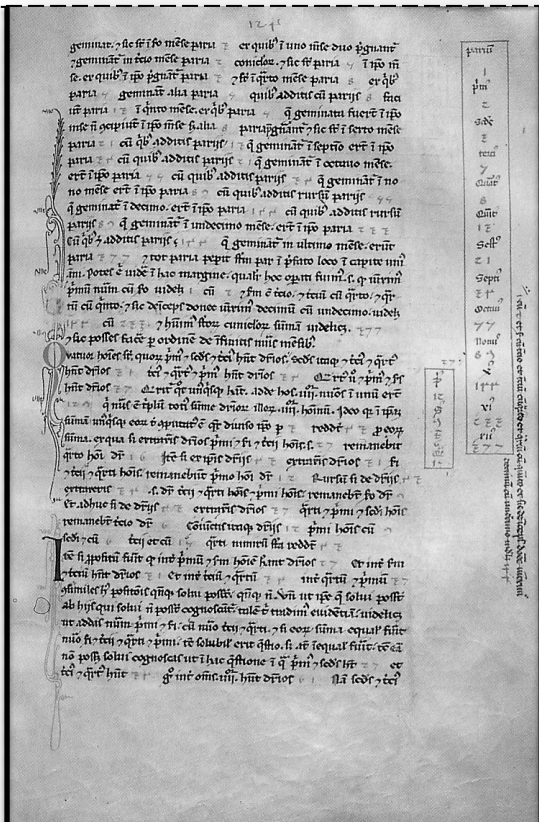
- Sequence labeled in Roman numerals
- Value shown in Hindu-Arabic numerals
- Book showed practical importance of new _____
- Book well received throughout Europe which impacted European thought

2. Leonardo of Pisa's Liber Abaci (Book of Calculation)

Fill in the blanks with the answers. Cut along the dotted lines, fold along the dark line creases. Cut out the title and glue to the backside of the first foldable page. The 3rd page on the right gets folded inward over top of the *Liber Abaci* page. The first page on the left is folded over top of both pages.

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3.

- By dividing a Fibonacci number by number before it, it gives the Golden Ratio or Golden Number, approximately 1.618034... etc.
- Ratio of each successive pair of numbers (divide higher number by the lower number) in sequence approximates phi (1.618033988749895 ..)

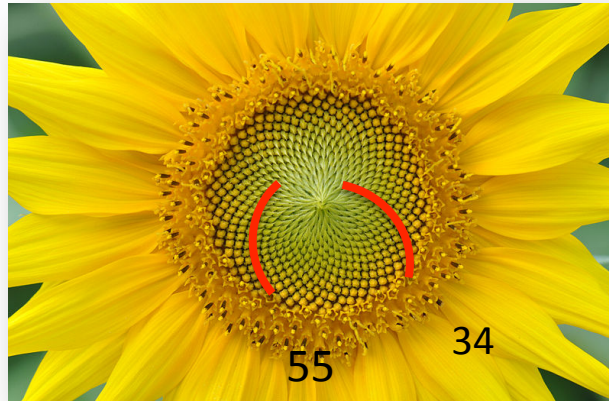
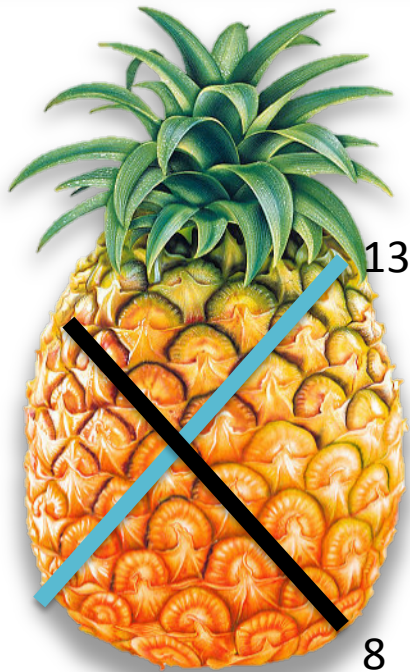
$$\begin{aligned}1/1 &= 1, & 2/1 &= 2, \\3/2 &= 1.5, & 5/3 &= 1.666..., \\8/5 &= 1.6, & 13/8 &= 1.625, \\21/13 &= 1.61538... \dots\end{aligned}$$

Follow the above sequence, with three more numbers. Write them below.

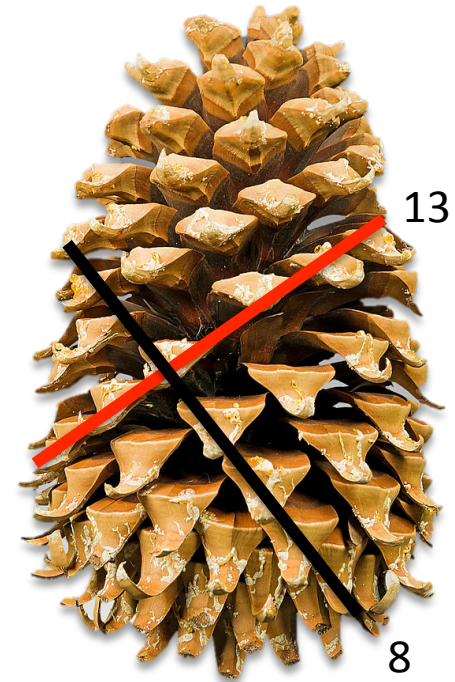
$$\begin{aligned}34/21 &= 1.61904 \\55/34 &= 1.61764 \\89/55 &= 1.61818\end{aligned}$$

3. The Fibonacci Numbers Relationship to Phi

Cut along the dotted lines, fold along the dark lines. The text is to fold inside the booklet. Glue the title on the back of the left page.

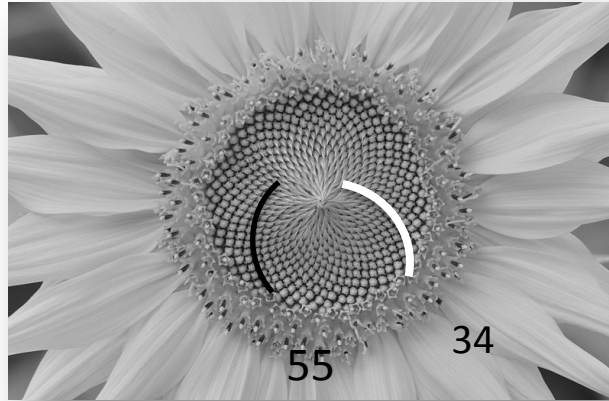
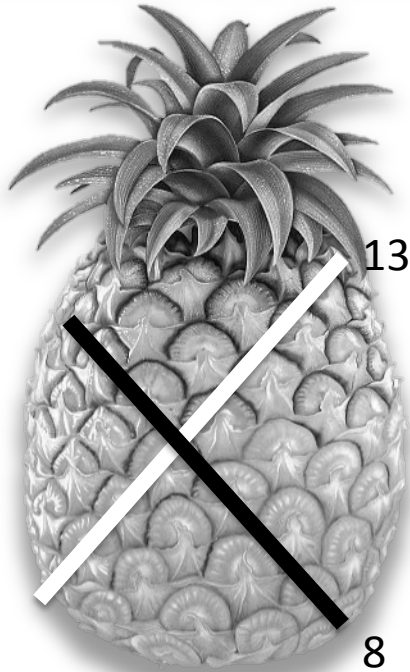


Fibonacci Numbers in pinecones, pineapples and sunflowers – The number of _____ turns about these plants, both clockwise and counterclockwise, are most often Fibonacci numbers.

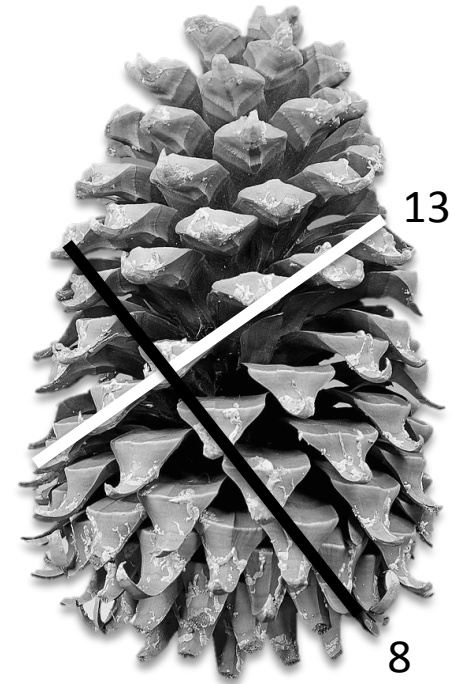


6. Fibonacci
Spiral
Turns

Cut along the dotted lines and fold along the dark line creases. Fold the pinecone inside over top of the sunflower. Fold the pineapple over top of both images. Cut out the title and put on the back of the pineapple image. Glue the back of the sunflower into your media of choice.

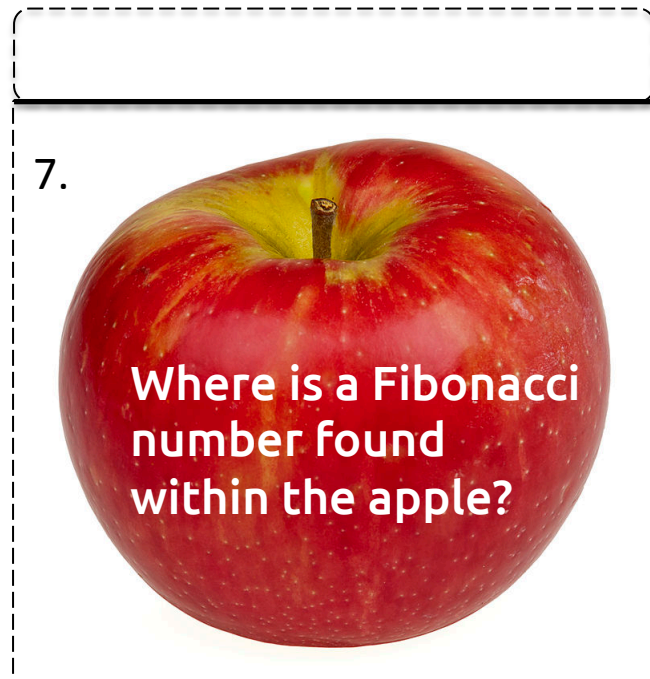


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Glue this little tab.

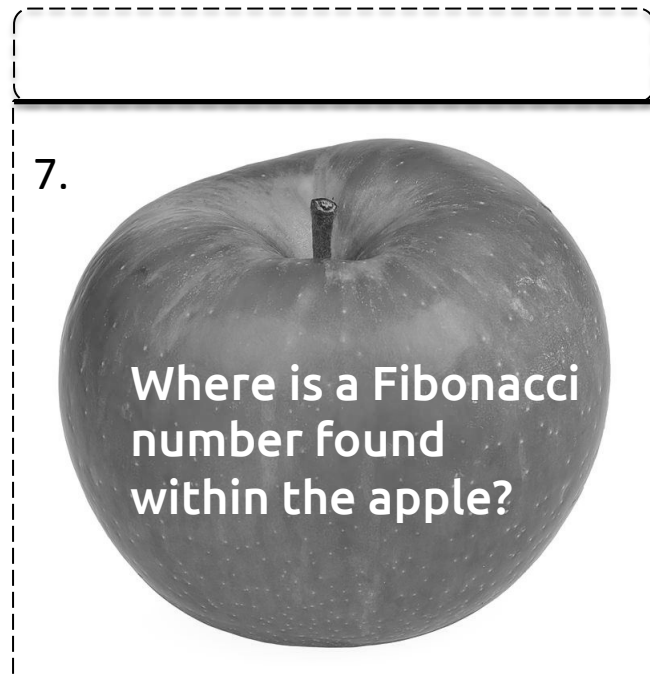


Cut out along the dotted lines and fold the little tab. Glue the back of the 5-pointed star apple cross-section to your media of choice. Place the whole red apple image directly above the apple cross section and glue the tab to your media.

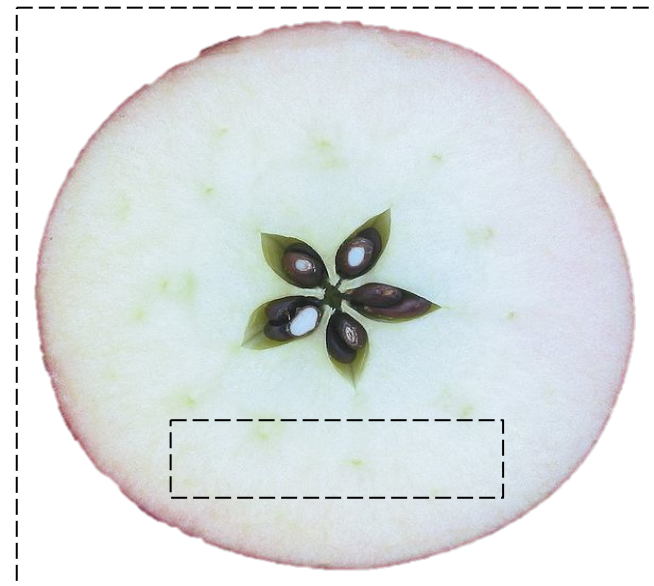


Glue on apple

5-pointed star

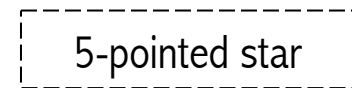


Glue this little tab.



Cut out along the dotted lines and fold the little tab. Glue the back of the 5-pointed star apple cross-section to your media of choice. Place the whole red apple image directly above the apple cross section and glue the tab to your media.

Glue on apple



Fibonacci Numbers in Nature

Templates Answer Keys

The Fibonacci Number Line up to 30 Numbers

0 : 0

1 : 1

2 : 1

3 : 2

4 : 3

5 : 5

6 : 8

7 : 13

8 : 21

9 : 34

10 : 55

11 : 89

12 : 144

13 : 233

14 : 377

15 : 610

16 : 987

17 : 1597

18 : 2584

19 : 4181

20 : 6765

21 : 10946

22 : 17711

23 : 28657

24 : 46368

25 : 75025

26 : 121393

27 : 196418

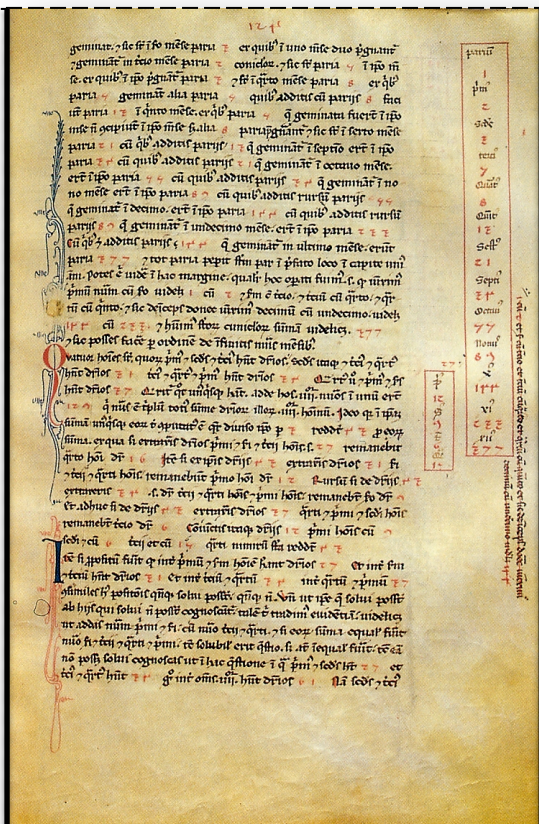
28 : 317811

29 : 514229

30 : 832040

2.

- Introduced **Hindu-Arabic** numerals (0 – 9) & place value to Europe
- 0-9 applied to commercial bookkeeping, weights conversion, measures, interest calculation, money-changing, and much more
- Reveals (in box on right) **Fibonacci sequence**



- Sequence labeled in Roman numerals
- Value shown in Hindu-Arabic numerals
- Book showed practical importance of new **number system**
- Book well received throughout Europe which impacted European thought

2. Leonardo of Pisa's Liber Abaci (Book of Calculation)

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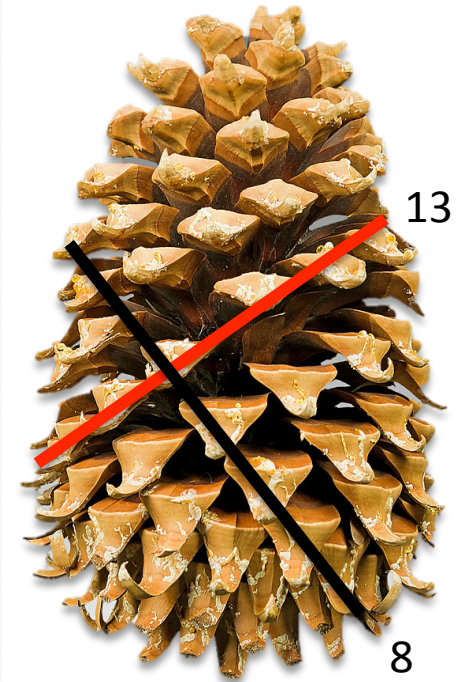
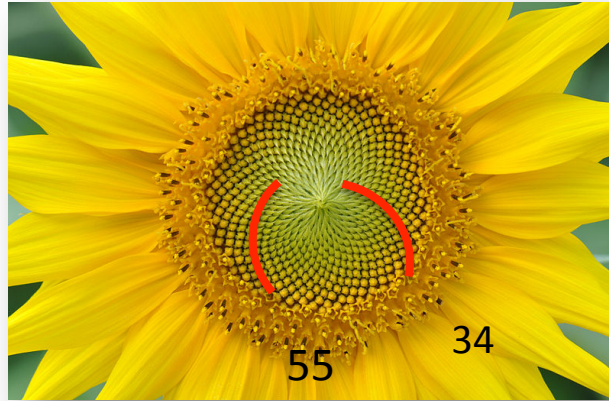
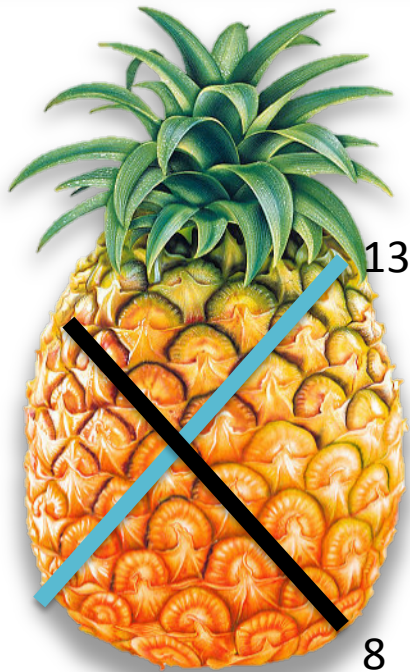
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Relationship to Phi

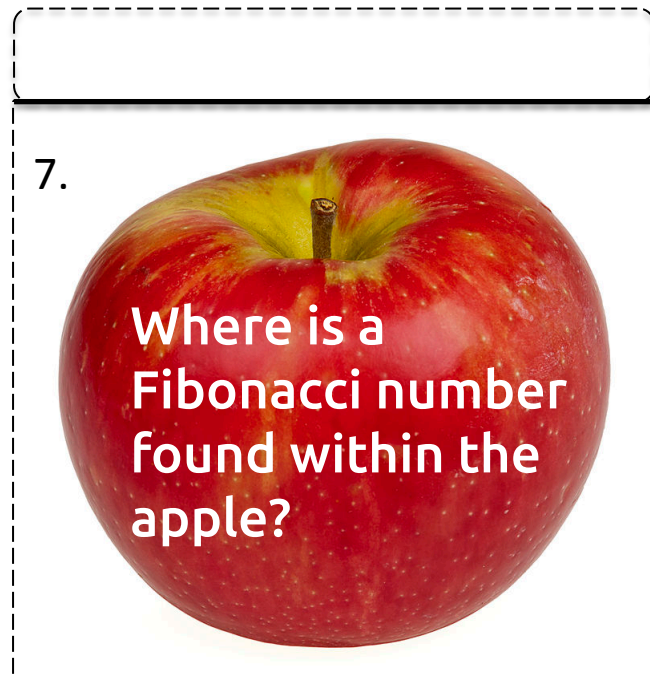
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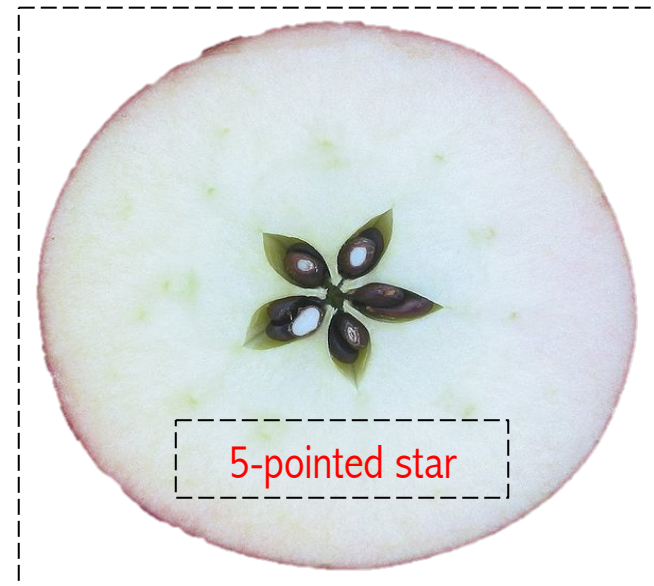
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Glue on apple

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