History and Research – Angles in Circles

Overview:

This lesson is intended to give a brief history on angles in circles while also providing some time for students to work on some math problems.

It covers some good topics in our new curriculum (like circle properties, working with numbers, and some history of math)

Instructions:

The lesson focuses on the number of degrees in a circle, how it was decided it would be 360° and what would happen if things had been different!

Slide 1	This slide will recap what students should already know about angles. 360° in a complete rotation, 180° in a half circle, 90° in a right angle. Opportunity to mention how rotations are referred to in snowboarding and skateboarding tricks.
Slide 2	360° should feel pretty arbitrary. Some students may know that it has to do with how many days there are in a year, but we will get to that later. The question is what would they pick if they could do it over again? I'm just guessing at this point, but most would probably pick 100 for a complete rotation.
Slide 3	Basing these answers off the likely decision that students pick 100, but the method is the same either way. Full Circle Rotation = 100 So Quarter Rotation = 25 (this isn't bad!) The Equilateral Triangle is tricky though. This might take some time with the class -> good opportunity to have them work in pairs for a minute or two. The 3 angles in a triangle add to 180°. So that is half of a complete rotation. So in our new 100° model, the 3 angles should add to 50°. And since all three angles are equal: 50°/3 = 16 2/3 (not such a nice number any more)
Slide 4	360 is divisible by a lot of numbers which is helpful. When we ask for whole numbers that divide into 360, that just means that we don't want any decimals (whole numbers = 0, 1, 2, … infinity) 360 is divisible by: 1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 15, 24, 30, 36, 40, 45, 60, 72, 90, 120, 180, 360 Notice that they come in pairs since 360/8 = 45 and 360/45 = 8
Slide 5	Provides some explanation about why it was important for the Babylonians to count the days and predict the seasons that were approaching. There are some animations that you might find interesting on the website link on that page. Here is the link: https://mathigon.org/course/circles/radians
Slide 6	A little more background info and mentions how the Babylonians counted in Base 60. We count in Base 10. Computers count in Base 2 (binary – just 1's and 0's) Base 60 is apparently also know as: Sexagesimal Feel free to mention that to the class and see what happens 😊

	Here is a website that talks a bit about base 60: https://www.thoughtco.com/why-we-still-use-babylonian-mathematics-116679 That is beyond the scope of the intended lesson however. The image of the clock shows what a clock would look like using a decimal (base 10 system)
Slide 7	The last slide with a new assumption: What if we lived on Mars. Have students do a search for how many days are in a year on Mars. It turns out that there are 687. Since the Babylonians weren't perfect either, we can decide what to round that to: 700? 680? Either way is fine. Then have the groups try to figure out the angles in the picture. a) Full circle = 700° b) Quarter circle = 700/4 = 175° c) Equilateral Triangle 700/2 = 350 □ the total for a triangle 350/3 = 116 2/3 for each angle.