**Worksheet 1 answers**

Eclipse Calculations – Looking at the NASA Data

1. How many eclipses we get year by year. Look at the 2011-2020 data sheets.

2014 2015 2016 2017 2018 2019 2020

2013

Number of Lunar Eclipses

Number of Solar eclipses

2011

2012

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   4  |  2 |   2 |   2 |  2 |  2 |  2 |  3 |  3 |  2 |
|  2 |  2 |  3 |  2 |  2 |  2 |  2 |  2 |  2 |  4 |
|  6 |  4 |  5 |  4 |  4 |  4 |  4 |  5 |  5 |  6 |

What is the most common number of eclipses in a year?\_\_4 times, 2 solar and 2 lunar eclipses\_.

Total number of eclipses

The number of eclipses each year is at least 4 times but can sometimes be 5, 6, or 7 (maximum). This means that the line of nodes stays in the direction of the sun for a window of time (but less than 2 months), or “eclipse season.” From the solar data sheet what are the **two** shortest times between 2 solar eclipses? and what can you say, from this data, is the longest “eclipse season”? Jun 1, 2011 - July 1, 2011 (30 days) AND July 13, 2018 - august 11, 2018 (29 days). Longest season is 30 days, meaning it is possible to get 3 eclipses every half year, or 6 in a year. The eclipse window just means that the Earth Moon sun can stay lined up for range of days (14-45).

1. **The number of days in between Solar Eclipses (refer to the Solar eclipse data sheet)**
2. We predicted that there should be eclipses every 6 months, what would this be in **days**, given there are 365.25 days in a year? \_\_182.62 days\_\_\_\_\_.
3. The actually number days between solar eclipses using NASA data.
4. Find the days from Oct. 23, 2014 eclipse to March 20, 2015: \_\_177 days\_\_\_\_\_\_.
5. Find the days from March 20, 2015 eclipse to Sept. 13, 2015: \_\_148 days\_\_\_\_\_\_.
6. Find the days from Sept. 13, 2015 eclipse to March 9, 2016: \_\_\_177 days\_\_\_\_\_.
7. Find the days from March 9, 2016 eclipse to Sept. 1, 2016: \_\_\_178 days\_\_\_\_\_.
8. Find the days from Sept. 1, 2016 eclipse to Feb. 26, 2017: \_\_\_\_176 days\_\_\_\_\_.
9. Find the days from Feb. 26, 2017 eclipse to Aug. 21, 2017: \_\_\_\_178 days\_\_\_\_.
10. Find the average actual number of days in between eclipses (1-6), use an average \_\_\_172.33 days\_\_\_\_.
11. Find the difference between the actual (iii) and your predicted (i) number of days\_\_\_\_\_10.28 days\_\_\_\_\_\_\_\_\_.
12. From these numbers, can you determine whether eclipses occur earlier or later than 6 months? and predicting out one year, what would the difference in days be? \_Actual eclipses occur less than 6 months; in a year the difference is about 20 days.