Name:_____

Laying eggs…

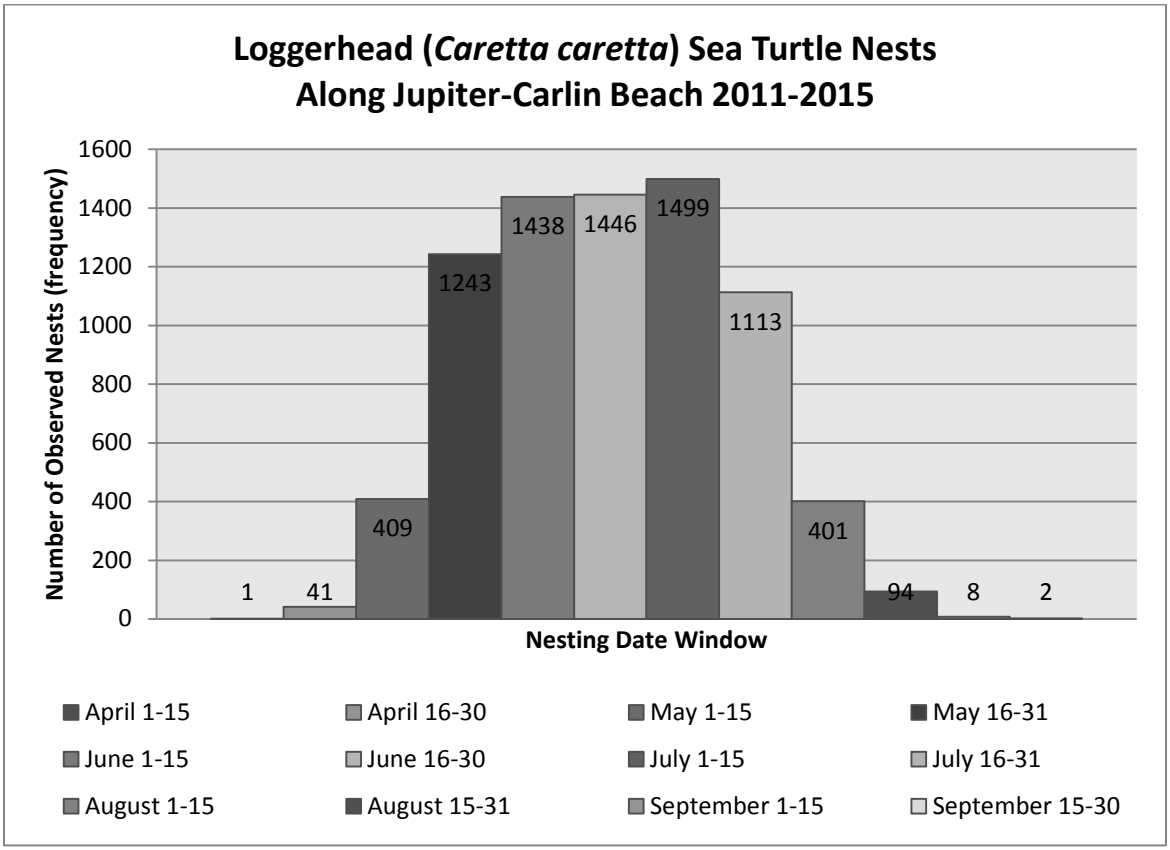
Could it be normal?

Use the data summary below, Loggerhead (*Caretta caretta*) sea turtle nesting dates along Jupiter-Carlin Beach from 2010-2015, to complete the following tasks.

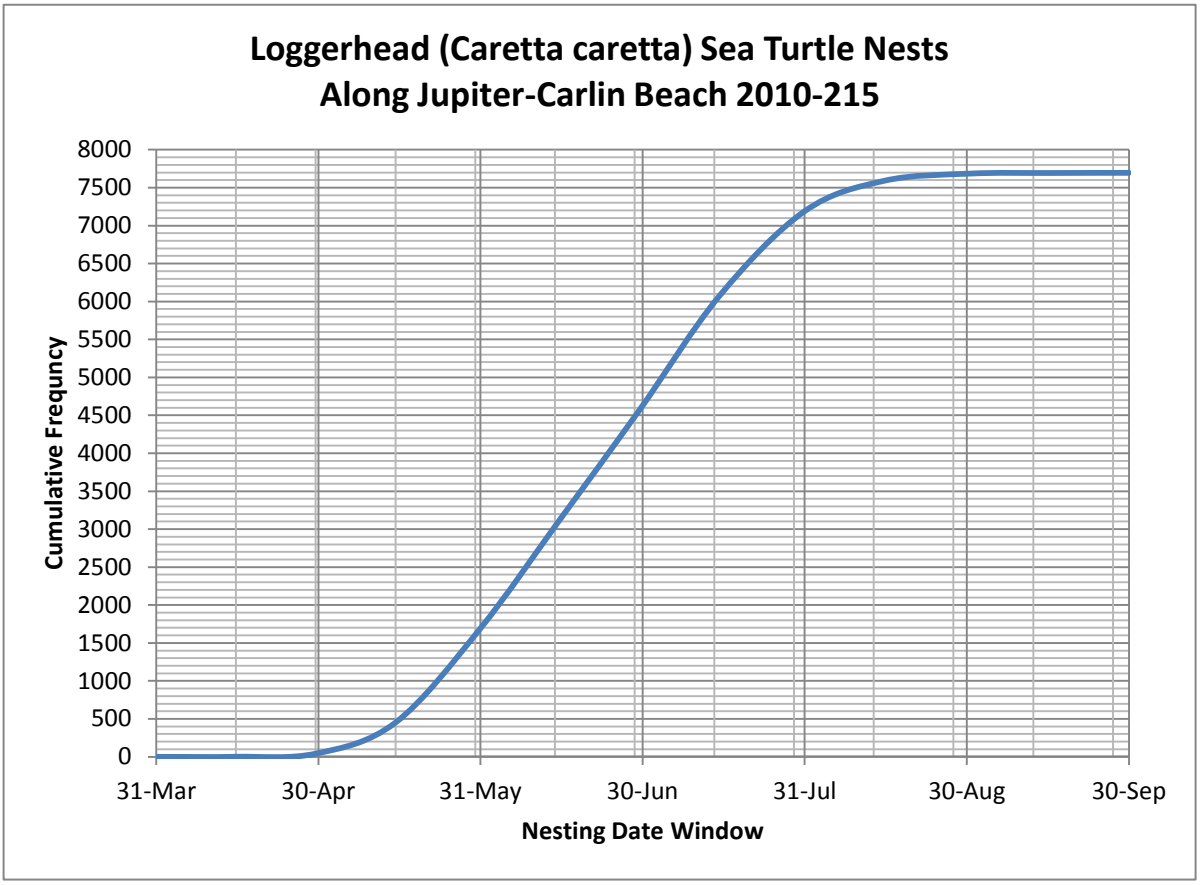
Nesting Date Window	Interval for the Day of the Year	Mid-Interval Day of the Year	Number of Observed Nests (Frequency)	Cumulative Frequency
April 1-15	91 – 105	$\frac{91+105}{2} = 98$	1	1
April 16-30	106 – 120	$\frac{107+121}{2} = 113$	41	41 + 1 = 42
May 1-15	121 – 135	*128*	409	*451*
May 16-31	136 – 151	*143.5*	1243	*1694*
June 1-15	152 – 166	*159*	1438	*3132*
June 16-30	167 – 181	*174*	1446	*4578*
July 1-15	182 – 196	*189*	1499	*6077*
July 16-31	197 – 212	*204.5*	1113	*7190*
August 1-15	213 – 227	*220*	401	*7591*
August 15-31	228 – 243	*235.5*	94	*7685*
September 1-15	244 – 258	*251*	8	*7693*
September 15-30	259 – 273	*266*	2	*7695*

1. Complete the table by filling in the mid-interval value and the cumulative frequency for each range of dates.

2. Create a histogram to represent the data set. Sketch the histogram below.



3. Create a cumulative frequency diagram (ogive) to represent the data set. Sketch the diagram below.



4. Analyze the histogram to see what can be learned about the center and variation of the number of nests.
    a. Estimate the mean using mid-interval values.

        $\mu = 174$

    b. Estimate the standard deviation.

        $\sigma = 25.9$

    c. What is the shape of the distribution?

        The distribution is bell shaped.

5. Determine whether the data can be considered normally distributed. Tell why or why not.

    Yes, the data can be considered a normal distribution. The histogram is bell-shaped and symmetric about the mean.

Name:_____

Using the Normal Distribution and its Properties

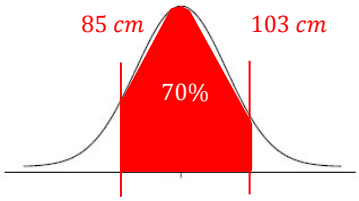
The nesting days for Loggerhead sea turtles along Jupiter-Carlin beach are normally distributed with a mean (μ) of the 174th day of the year and a standard deviation (σ) of 25.9 days.

1. Calculate the probability the following will occur:
   a. $P(x \leq 183) = 64\%$
   b. $P(141 \geq x \geq 183) = 53\%$
   c. $P(x = 205) = 0.8\%$
2. Find the day of the year when the probability of a Loggerhead nesting is 45%.

   170.7th day

The length of Loggerhead sea turtle shells are normally distributed and 70% of the sea turtles along the coast have a shell length between $85\ cm$ and $103\ cm$.

3. Sketch a diagram of the normal curve with the above information clearly labelled.



4. Using z-scores, find the mean and standard deviation for the length of the sea turtle shells along this coastline.

$$z = InverseNorm(0.2, 0, 1) = -0.84$$

$$z = InverseNorm(0.9, 0, 1) = 1.28$$

Set up a system of equations to solve for μ and σ: $1.28 = \frac{103-\mu}{\sigma}$ and $-0.84 = \frac{85-\mu}{\sigma}$

$$\mu = 92.1\ cm \text{ and } \sigma = 8.5\ cm$$