Open the TI-Nspire document *Looking_Normal.tns.*

Hypothesis tests and confidence procedures for means of
populations frequently assume that the population under question
is normally distributed. In most cases, however, the researcher
does not know much about the population—that's why it's being
studied. Thus decisions about the shape of the population are
often made by looking at the shape of the sample from that
population. This lesson examines the variability in the shapes of
the distributions of individual samples when the population is
known to be normal.
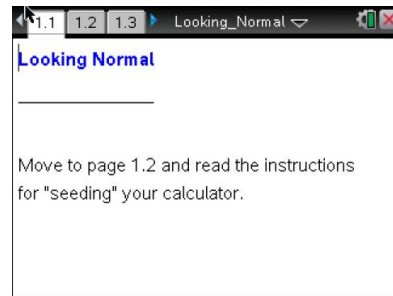
Move to page 1.2.

Press ⬜ctrl ▶ and ⬜ctrl ◀ to
navigate through the lesson.

This activity involves generating a number of random samples from a normal population. In order to
avoid having your results be identical to those for another student in the room, it is necessary to
"seed" the random number generator. Read the instructions on Page 1.2 for seeding your random
number generator, then carry out that seeding on Page 1.3.

Move to page 2.1.

1. The graph on the top of Page 2.1 represents a population of head circumferences measured in
    centimeters that is approximately normally distributed. Suppose you were to select a random
    sample from this population. Describe how you would expect the points representing your sample
    values to be distributed. Explain briefly.

2. Click on the arrow on Page 2.1 to generate a random sample of size *n* = 50 from the population. Is
    your sample distributed approximately as you predicted?

Move to page 2.2.

3. a. Page 2.2 displays a histogram of the same sample values you generated on Page 2.1. How well
        does it capture the shape you saw in the dot plot?

    b. Click the arrow at the top left of the page to overlay a normal density curve. Does the histogram
        seem to fit the normal curve reasonably well?

Move to page 2.3.

4. The graph on Page 2.3 is a Normal Probability Plot, or NPP, of your sample data. Recall that linearity in an NPP indicates normality in the distribution of the data it represents. Based on that principle, would you say that your sample appears to be approximately normally distributed?

5. Which of your graphs from Pages 2.1, 2.2, and/or 2.3 makes it easiest to determine "how normal" your sample is? Explain briefly.

6. Compare your graphs in Pages 2.1, 2.2 and 2.3 to those of your classmates. Describe how corresponding graphs seem to differ from student to student, and how often someone's graph looks "really non-normal."

Move to page 3.1.

7. a. The "sample size" arrow in Page 3.1 is set to $n = 35$. Click on the "draw" arrow to select a random sample of size 35 from the given population. Compare the shapes of the graphs on Pages 3.1, 3.2, and 3.3 to those you saw in your and your classmates' Problem 2.

   b. Look back at your prediction about shape in Question 1. Does your sample of size $n = 35$ seem to fit your prediction pretty well?

Move back to page 3.1.

8. a. Use the "sample size" arrow to decrease the sample size, then click the "draw" arrow to get a new sample. Look at Pages 3.1, 3.2, and 3.3, and describe how well this new sample fits the shape you predicted back in question 1.

   b. Which of the three graphs is easiest to interpret in judging the normality of your sample now? Explain why you think that is the case.