Haunted or Hoax?

Student Activity

Name _____

Class _____

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

Morgan is a photojournalist on assignment to document the popular television show *Ghost Nabbers*. Equipped with her camera and curiosity she is ready to find out what makes the television show so popular with viewers…especially since, so far, they haven't actually found a single ghost yet!
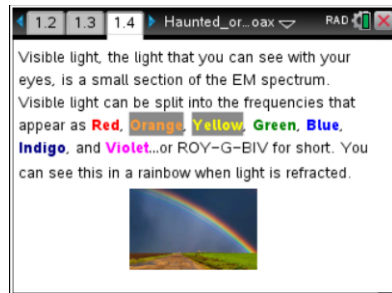

Move to pages 1.2—1.3.

1. Read through these pages to become familiar with the storyline and the electromagnetic spectrum.
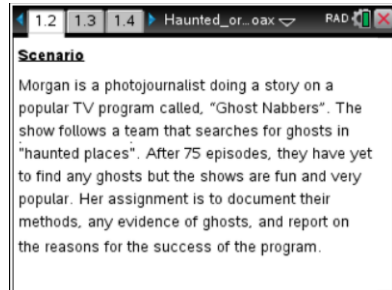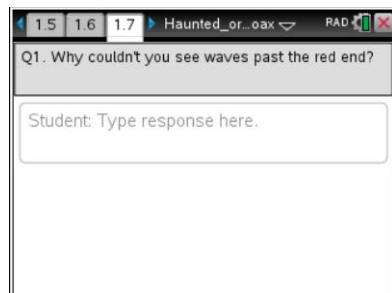
Move to pages 1.4 – 1.6.

2. Pages 1.4 to 1.6 provide important information about visible light: the part of the EM spectrum that humans can see with their eyes. Visible light is composed of seven colors (i.e., frequencies that the brain interprets as color).

Move to page 1.7.

Answer the question here and/or in the .tns file.

Q1. Why couldn't you see waves past the red end?

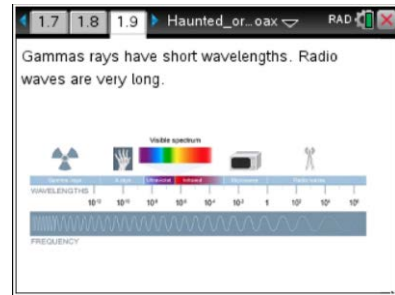**Move to pages 1.8--1.9.**

3. Pages 1.8 and 1.9 introduce the definition of wavelength and provide an image of all of the relative portions of the EM spectrum for comparison.
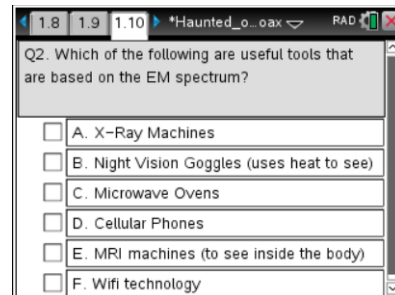
Move to pages 1.10.

Answer the questions here and/or in the .tns file.

Q2. Which of the following are useful tools that are based on the EM Spectrum?

　　A. X-Ray Machines
　　B. Night Vision Goggles (uses heat to see)
　　C. Microwave Ovens
　　D. Cellular Phones
　　E. MRI machines (to see inside the body)
　　F. Wifi Technology

Move to pages 1.11—1.12.

4. Pages 1.11 and 1.12 provide a simulation of a (virtual) camera, since a camera is such an essential tool for photojournalists. This simulation enables an understanding of the camera aperture and how the amount of light that is permitted into the camera is related to the aperture diameter.
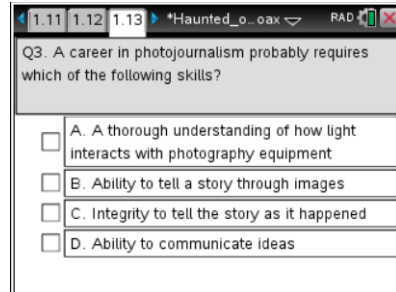
Move to pages 1.13.
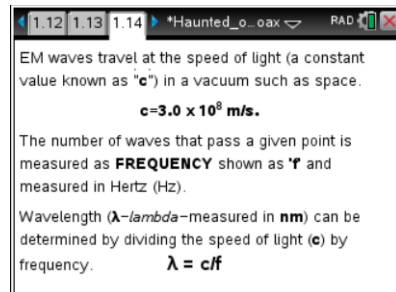
Answer questions here and/or in the .tns file.

Q3.   A career in photojournalism probably requires which of the following skills (Select all that apply)?

    A.   A thorough understanding of how light interacts with photography equipment

    B.   Ability to tell a story through images

    C.   Integrity to tell the story as it happened

    D.   Ability to communicate ideas

Move to pages 1.14 – 1.15.

5.   Pages 1.14 and 1.15 explain the speed of light as a constant, the concept of frequency, and the equation for the relationship among wavelength, frequency, and the speed of light.
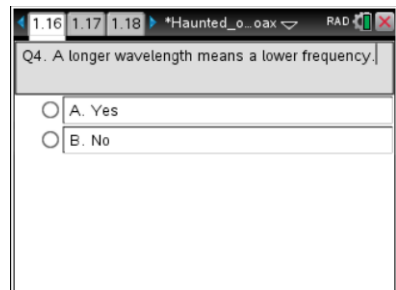
Move to pages 1.16 – 1.17.

Answer the questions here and/or in the .tns file.
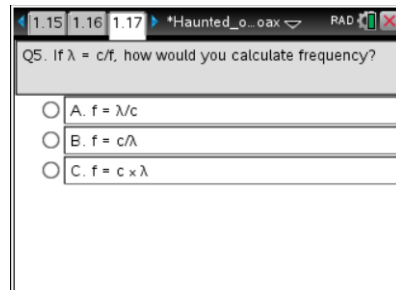
Q4.   A longer wavelength means a lower frequency.

    A.   True

    B.   False

Q5.   If $\lambda = c/f$, how would you calculate frequency?

    A. $f = \lambda/c$

    B. $f = c/\lambda$

    C. $f = c \times \lambda$
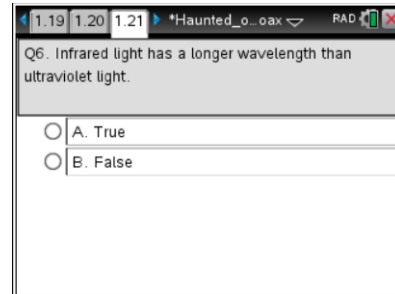
Move to pages 1.18 – 1.20.

6. Pages 1.18 through 1.20 reveal that the team and photojournalist will be exploring Deadman's Curve the alleged haunt of the infamous "Biker Bob". The team explains the use of a new device they've created called the Specter Spotter that senses wavelengths in UV, visible, and IR radiation and converts the detection of waves into images. The photojournalist begins asking inconvenient questions of the Nabbers that reveal some possible holes in their ghost hunting technology.

Move to pages 1.21.

Answer questions here and/or in the .tns file.

Q6.   Infrared light has a longer wavelength than ultraviolet light.

    A. True
    B. False

Move to pages 1.22 – 1.23.

7. Pages 1.22 and 1.23 reveal "evidence" for the ghost of Biker Bob.

Move to pages 1.24 – 1.25.

8. Pages 1.24 and 1.25 documents an interview the Nabbers are giving the photojournalist. The answers from the Nabbers seem to be reasonable until the journalist starts to ask tougher questions revealing a lack of understanding the Nabbers have regarding the interactions between matter and light.
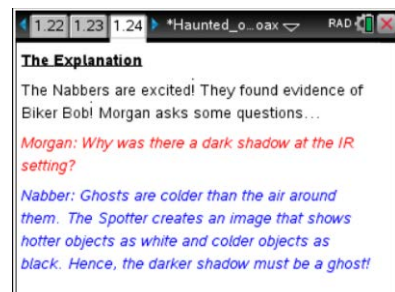
Move to pages 1.26 – 1.28 and 1.30.

9. Pages 1.26 through 1.28 and 1.30 explain the clues found by the photojournalist at the Biker Bob site. RFID (radio frequency identification) technology used with a radio inside the Specter Spotter seems to trigger the images in the Specter Spotter. The Nabbers apparently set up the technology to fool the photojournalist and their fans into believing they found actual evidence of a ghost. The RFID technology uses radio waves, another part of the EM spectrum.
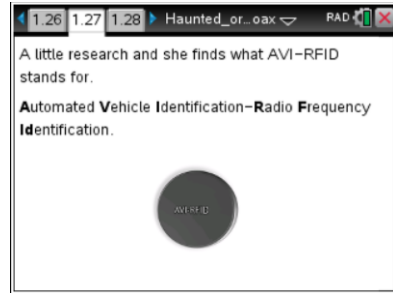
Move to page 1.29.
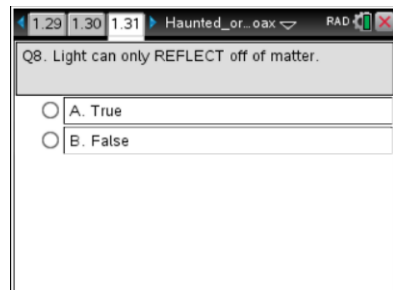
Q7. AVI-RFID uses a frequency of 928 MegaHz.
Calculate λ in nm. Use the calculator below.
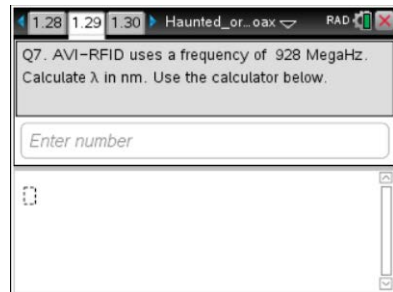
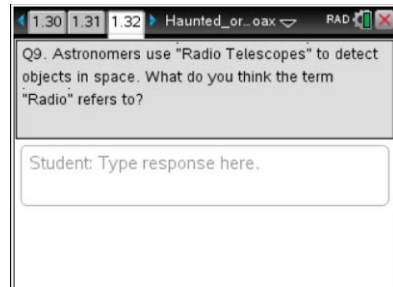**Move to pages 1.31 -- 1.32.**

Q8. Light can only REFLECT off of matter.

A. True
B. False

Q9. Astronomers use "Radio Telescopes" to see objects in space. What do you think the term "Radio" refers to?

Move to pages 1.33

10. Page 1.33 is the end of the activity