Answer the following questions as you proceed through the activity slides.

1. On slide 1, “p53” is referred to as a molecule, a protein, and a gene; it is also referred to as being mutated. In your own words, and based on your knowledge of molecular genetics, how are these terms related?

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2. Define the following terms:
   a. Oncogene: _________________________________________________________________
   b. Tumor suppressor gene: _______________________________________________________
   c. DNA repair gene: _____________________________________________________________

3. Based on the information on slide 2, how is p53 related to oncogenes and tumor suppressor genes?

_____________________________________________________________________________________
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4. Watch the video clip on slide 2 and answer the following questions:
   a. How is a mutated oncogene analogous to a 100-pound weight on the gas pedal in a car?
      _______________________________________________________
      _______________________________________________________
   b. How does the car analogy apply to a mutated tumor suppressor gene?
      _______________________________________________________
      _______________________________________________________
   c. What is required for a cell to “spin out of control”?
      _______________________________________________________
      _______________________________________________________

5. What three conditions or factors activate p53 to shut down cell division?
   _______________________________________________________
   _______________________________________________________

6. Why is p53 called the “guardian of the genome”?
   _______________________________________________________
   _______________________________________________________

7. The p53 protein contains three domains. In your own words, what is the function of each domain?
   a. Transactivation domain: _____________________________________________________________
   b. DNA binding domain: ______________________________________________________________
   c. Complexing domain: _______________________________________________________________

8. What is a transcription factor?
   _______________________________________________________

9. Based on the information given in slides 3 and 5, for what set of genes does p53 act as a transcription factor?
   _______________________________________________________

10. What are the two roles of Mdm2?
     _______________________________________________________

11. Watch the video clip on slide 6 and answer the following questions:
   a. What is the purpose of ubiquitin?

   b. What is the role of the proteasome?


13. Read slide 7 and watch the animation. Answer the following:
   a. How does p53 “turn on” transcription?

   b. Name two cell processes that are regulated by p53?

   c. Cancer can be defined as “uncontrolled cell division.” Based on this definition, explain how mutations in the p53 gene play a role in cancer.