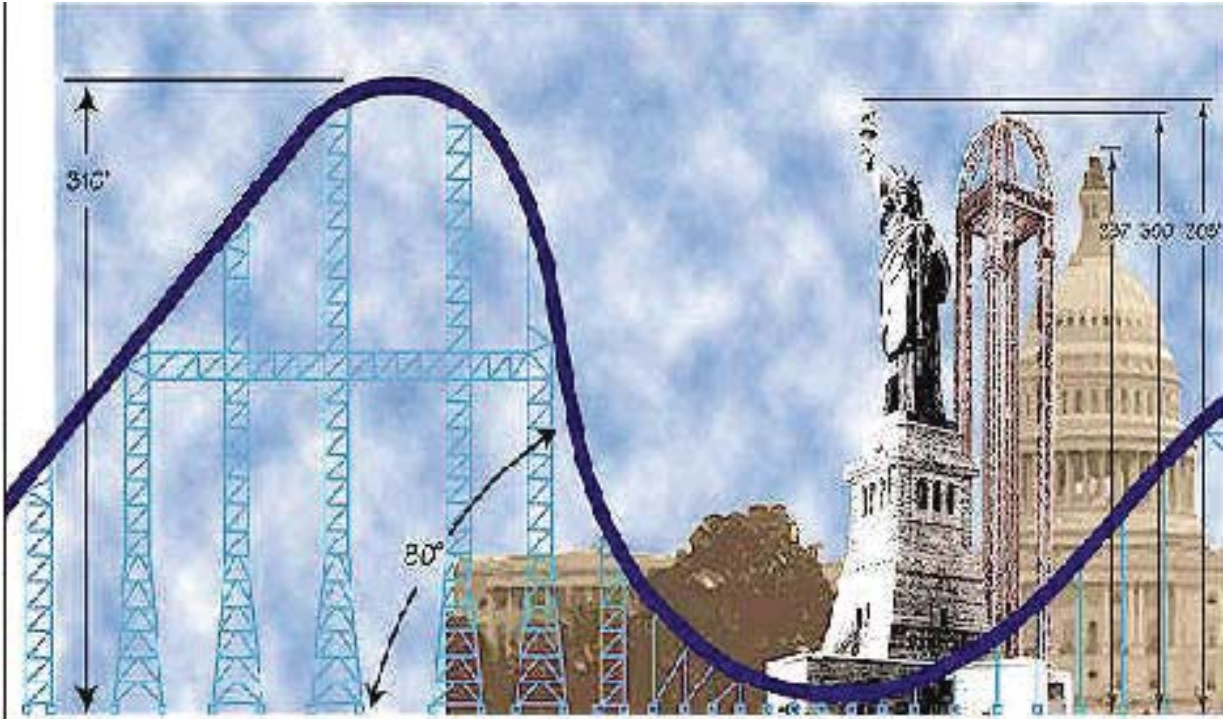# Scale Drawing of Roller Coaster

Name _____

Directions: Below is a scale drawing of a portion of the Millennium Force, a roller
coaster located in Cedar Point Amusement Park in Ohio. Answer the
questions that follow and show all work on additional paper. Remember
to always include units!

Part I. Measuring

1. What is the maximum height of the roller coaster? _____

2. What is the height of the Statue of Liberty? _____

3. What is the height of the Capitol building? _____

4. A Pepsi Can is 5 inches tall. If you stacked the cans on top of each other, how
many cans would be needed in order to reach the maximum height of the roller

coaster?

_____

5. Using inches on a ruler, measure the maximum height of the roller coaster in the

picture. _____

Part II - Scale

6. To determine the scale of a picture, you need to calculate how many feet each
   inch represents. Determine the scale of the picture. For example, if the building is
   actually 100 feet tall but in the picture it is only 2 inches, your scale would be :
   1 inch represents 50 feet. _____

7. Extend the initial uphill track so that it now touches the ground (bottom of the
   picture). Remember not to change the slope of this line, so use a ruler to continue
   the track.

8. Lay your string perfectly over the entire initial uphill track and the entire
   downhill track. Do not cover any of the track that begins to slope back up.

9. Starting at the bottom of the initial uphill track, trace the string which covers the
   uphill portion of track with a blue marker. Stop at the maximum height of the roller
   coaster.

10. Starting from the maximum height of the roller coaster, trace the string which
    covers the downhill portion of the track with a red marker. Stop at the lowest point
    before it begins to slope back upward.

11. Place the string on your desk in a straight line. Using inches on your ruler,
    measure the blue portion of your string. This represents the initial uphill portion
    of the roller coaster from the picture. Record your measurement.

    _____

12. Using the scale you discovered in question #5, how long is the actual initial uphill
    track in feet? _____

13. With the string still straight and flat on your desk, measure the red portion of the
    string using inches on your ruler. _____

14. Using the scale you discovered in question #5, how long is the actual downhill

Part III - Angles

15. The angle of a roller coaster is formed from the steepest part of the track and the
    ground. Using the picture of the roller coaster, what is the angle measurement
    of the Millennium roller coaster? _____

16. Lay your string over the picture of the roller coaster. Make sure that the blue
    portion of the string is covering the entire portion of the initial uphill track.

17. Decrease the angle of the roller coaster on the downhill portion of the track. Move your string to resemble the new angle of the roller coaster. Measure your new angle. New Angle: _____

18. What happens to the length of the downhill track when the angle decreases?

   _____
   _____
   _____

19. How will a decreased angle measurement affect the speed of the roller coaster?

   _____
   _____
   _____
   _____
   _____

20. Increase the angle of the roller coaster on the downhill portion of the track. Move your string to resemble the new angle of the roller coaster. Measure your new angle. New Angle: _____

21. What happens to the length of the downhill track when the angle increases?

   _____
   _____
   _____
   _____
   _____

22. How will an increased angle measurement affect the speed of this portion of the track? _____

   _____

Scale Drawing of Roller Coaster

Name _____

Directions: Below is a scale drawing of a portion of the Millennium Force, a roller coaster located in Cedar Point Amusement Park in Ohio. Answer the questions that follow and show all work on additional paper. Remember to always include units!
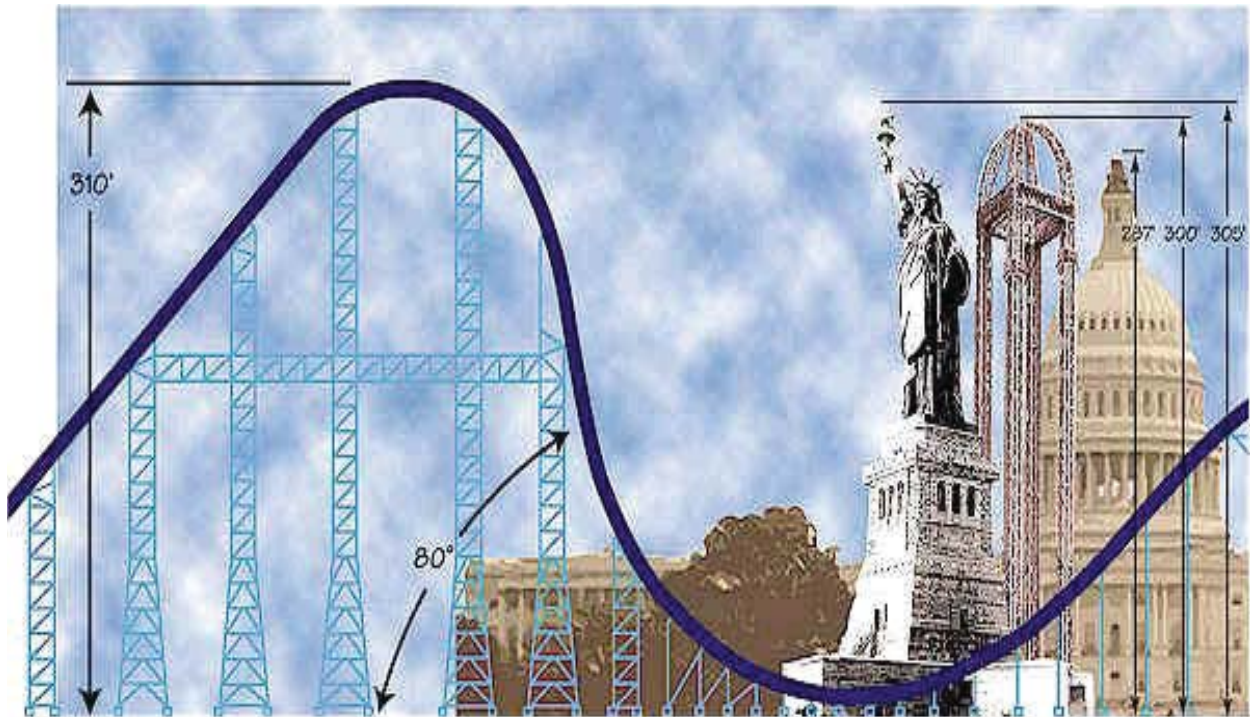
Part I. Measuring

1. What is the maximum height of the roller coaster? _____**310 FEET**_____

2. What is the height of the Statue of Liberty? _____**305 FEET**_____

3. What is the height of the Capitol building? _____**237 FEET**_____

4. A Pepsi Can is 5 inches tall. If you stacked the cans on top of each other, how many cans would be needed in order to reach the maximum height of the roller coaster?
    _____**744 CANS OF PEPSI**_____

5. Using inches on a ruler, measure the maximum height of the roller coaster in the picture. _____**3.25 INCHES**_____

Part II - Scale

6. To determine the scale of a picture, you need to calculate how many feet each
    inch represents. Determine the scale of the picture. For example, if the building is
    actually 100 feet tall but in the picture it is only 2 inches, your scale would be :
    1 inch represents 50 feet. __**1 INCH = 95.38 FEET**_____

7. Extend the initial uphill track so that it now touches the ground (bottom of the
    picture). Remember not to change the slope of this line, so use a ruler to continue
    the track.

8. Lay your string perfectly over the entire initial uphill track and the entire
    downhill track. Do not cover any of the track that begins to slope back up.

9. Starting at the bottom of the initial uphill track, trace the string which covers the
    uphill portion of track with a blue marker. Stop at the maximum height of the roller
    coaster.

10. Starting from the maximum height of the roller coaster, trace the string which
     covers the downhill portion of the track with a red marker. Stop at the lowest point
     before it begins to slope back upward.

11. Place the string on your desk in a straight line. Using inches on your ruler,
     measure the blue portion of your string. This represents the initial uphill portion
     of the roller coaster from the picture. Record your measurement.
     _____**4.5 INCHES**_____

12. Using the scale you discovered in question #5, how long is the actual initial uphill
     track in feet? ___**429.23 FEET**_____

13. With the string still straight and flat on your desk, measure the red portion of the
     string using inches on your ruler. _____**4.125 INCHES**_____

14. Using the scale you discovered in question #5, how long is the actual downhill
     portion of the track in feet? _____**393.46 FEET**_____

Part III - Angles

15. The angle of a roller coaster is formed from the steepest part of the track and the
     ground. Using the picture of the roller coaster, what is the angle measurement
     of the Millennium roller coaster? _____**80 DEGREES**_____

16. Lie your string over the picture of the roller coaster. Make sure that the blue portion of the string is covering the entire portion of the initial uphill track.

17. Decrease the angle of the roller coaster on the downhill portion of the track. Move your string to resemble the new angle of the roller coaster. Measure your new angle. New Angle: __**ANSWERS WILL VARY.**__

18. What happens to the length of the downhill track when the angle decreases? __**YOUR TRACK LENGTH MUST INCREASE IN ORDER**__ __**FOR THE HILL TO COME BACK DOWN TO THE SAME DISTANCE ABOVE THE GROUND.**__

19. How will a decreased angle measurement affect the speed of the roller coaster? __**A DECREASED ANGLE WILL CAUSE THE DOWNHILL TRACK TO BE LESS STEEP AND THIS WILL ALSO DECREASE THE TOP SPEED OF THE ROLLER COASTER AND THE AVERAGE SPEED OF THE ROLLER COASTER. THE SMALLER THE ANGLE, THE SLOWER THE SPEED.**__

20. Increase the angle of the roller coaster on the downhill portion of the track. Move your string to resemble the new angle of the roller coaster. Measure your new angle. New Angle: __**ANSWERS WILL VARY.**__

21. What happens to the length of the downhill track when the angle increases? __**YOUR TRACK LENGTH MUST DECREASE IN ORDER FOR THE HILL TO COME BACK DOWN TO THE SAME DISTANCE ABOVE THE GROUND.**__

22. How will a increased angle measurement affect the speed of this portion of the track? __**AN INCREASED ANGLE WILL CAUSE THE DOWNHILL TRACK TO BE MORE STEEP, AND THIS ALSO WILL INCREASE THE TOP SPEED OF THE ROLLER COASTER AND THE AVERAGE SPEED OF THE ROLLER COASTER. THE LARGER THE ANGLE, THE FASTER THE SPEED.**__