

Name: \_\_\_\_\_

## Amusement Park Activity

**Part 1 Instructions:** You and your group are opening your own amusement park. Lucky for you, most of the hard work has already been done by your mechanical engineers. They have designed, built, and tested 8 rides for your park. Your job is to calculate the maximum amount of kinetic energy each ride will have and then to classify each ride as green, yellow, or red.

### Classification Chart

Classification	Height Requirements	Kinetic Energy (Joules)
Green	None	40,000 – 300,000
Yellow	$\geq 4$ feet	300,001 – 400,000
Red	$\geq 5$ feet	400,0001 - 900,000

#### Roller Coaster 1: Hurricane

**Description:** The hurricane is the fastest roller coaster in the park. It does not include any loops or upside-down rolls, but this coaster has the highest coaster peak in the state.

**Mass:** 3,000 kilograms

**Initial hill height from ground:** 32 meters

**Bottom of initial hill:** 2 meters

1. Calculate the kinetic energy of the Hurricane at the bottom of the initial hill.
2. Classify the Hurricane based on the provided chart.

#### Roller Coaster 2: Dragon

**Description:** The Dragon has a small round track with one larger hill and a few smaller hills. Each ride consists of 3 times around the track.

**Mass:** 1,000 kilograms

**Initial hill height from ground:** 8 meters

**Bottom of initial hill:** 3 meters

1. Calculate the kinetic energy of the Dragon at the bottom of the initial hill.
2. Classify the Dragon based on the provided chart.

### Roller Coaster 3: Corkscrew

**Description:** The Corkscrew provides riders with the greatest thrill in the park. It includes multiple loops and corkscrews and is the second fastest roller coaster in the park.

**Mass:** 2,500 kilograms

**Initial hill height from ground:** 27 meters

**Bottom of initial hill:** 4 meters

1. Calculate the kinetic energy of the Corkscrew at the bottom of the initial hill.
2. Classify the Corkscrew based on the provided chart.

### Roller Coaster 4: Sky Coaster

**Description:** The Sky Coaster is the park's oldest wooden roller coaster. It provides riders with the thrill of riding on a classic old coaster and speeding down each hill with nothing but a small bar on their laps. This roller coaster is not as fast as the Hurricane or Corkscrew but is still a thrill!

**Mass:** 2,000 kilograms

**Initial hill height from ground:** 20 meters

**Bottom of initial hill:** 1 meter

1. Calculate the kinetic energy of the Sky Coaster at the bottom of the initial hill.
2. Classify the Sky Coaster based on the provided chart.

### Log Flume

**Description:** The Log Flume is a classic water ride on which riders ride in "logs" around a watery track and speed down hills into pools of water.

**Mass:** 1,900 kilograms

**Biggest hill height from ground:** 16 meters

**Bottom of biggest hill:** 3 meters

1. Calculate the kinetic energy of the Log Flume at the bottom of its largest hill.

2. Classify the Log Flume based on the provided chart.

### **Pirate Ship**

**Description:** The Pirate Ship is a classic ride built like a pirate ship on which riders swing from side to side. Riders are either low below the other side or high above the other side.

**Mass:** 4,000 kilograms

**Height at highest point:** 10 meters

**Height at lowest point:** 2 meters

1. Calculate the kinetic energy of the Pirate Ship when one side swings from the highest point down to the lowest point.
2. Classify the Pirate Ship based on the provided chart.

### **The Tower**

**Description:** The Tower slowly brings riders to the top of a vertical column and dangles them there for 30 seconds before dropping them from the top to just 1 meter above the ground.

**Mass:** 2,700 kilograms

**Height at highest point:** 18.5 meters

**Height at lowest point:** 1 meter

1. Calculate the kinetic energy of the Tower right before it is stopped at the one-meter mark.
2. Classify the Tower based on the provided chart.

**Part 2 Instructions:** You will now create a brochure with a map of your amusement park. The map must include pictures, names, kinetic energy amounts, and classifications for each ride. If you need space to brainstorm, use the space provided below.