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# Install leaflet if not already installed
install.packages("leaflet")

# Load library
library(leaflet)

# Basic world map
leaflet() %>%
  addTiles() %>% # Default OpenStreetMap tiles
  setView(lng = 78.9629, lat = 20.5937, zoom = 4) # Centered on India

# Add markers with popup
leaflet() %>%
  addTiles() %>%
  addMarkers(lng = 77.2090, lat = 28.6139, popup = "New Delhi, India") %>%
  addMarkers(lng = 72.8777, lat = 19.0760, popup = "Mumbai, India")

#add circle markers
cities <- data.frame(
  city = c("Delhi", "Mumbai", "Chennai", "Kolkata"),
  lat = c(28.6139, 19.0760, 13.0827, 22.5726),
  lng = c(77.2090, 72.8777, 80.2707, 88.3639),
  population = c(19000000, 12400000, 7100000, 4600000)
)

leaflet(cities) %>%
  addTiles() %>%
  addCircleMarkers(
    ~lng, ~lat,
    radius = ~population/2000000,
    color = "red",
    fillOpacity = 0.6,
    popup = ~paste(city, "<br>Population:", population)
  )

# Example: Simple polygon (triangle)
polygon_coords <- data.frame(
  lng = c(77, 78, 79, 77),
  lat = c(28, 29, 28, 28)
)

leaflet() %>%
  addTiles() %>%
  addPolygons(data = polygon_coords, lng = ~lng, lat = ~lat,

```

```
color = "blue", fillColor = "lightblue",  
popup = "Sample Polygon")
```

```
library(ggplot2)  
library(dplyr)  
library(sf)  
library(leaflet)
```

```
# Get US states map data  
states <- map_data("state")
```

```
# Convert to sf polygons  
states_sf <- st_as_sf(states, coords = c("long", "lat"), crs = 4326, agr = "constant") %>%  
  group_by(region, group) %>%  
  summarise(do_union = FALSE) %>%  
  st_cast("POLYGON") %>%  
  ungroup()
```

```
# Leaflet map with hover labels  
leaflet(states_sf) %>%  
  addTiles() %>%  
  addPolygons(  
    fillColor = "lightgreen",  
    color = "black",  
    weight = 1,  
    fillOpacity = 0.5,  
    label = ~region, # hover tooltip shows state name  
    highlightOptions = highlightOptions(  
      weight = 3,  
      color = "blue",  
      fillOpacity = 0.7,  
      bringToFront = TRUE  
    )  
  )
```

```
install.packages("leaflet.extras")  
library(leaflet.extras)
```

```
leaflet(cities) %>%  
  addTiles() %>%  
  addHeatmap(lng = ~lng, lat = ~lat, intensity = ~population,  
    blur = 20, max = 0.05, radius = 15)
```