

# Radar assignment 7 parts 1-9

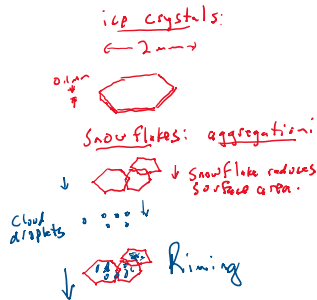
Tuesday, February 17, 2026 9:14 PM

Submission is through webcampus. Copy these questions to MS word and work on them. Be sure to give your sources for answers.

## Basics:

1. What is the diameter range for raindrops?
2. What is the diameter range for drizzle drops?
3. What is the diameter range for cloud droplets?
4. What is the shape of raindrops?
5. Why don't raindrops get arbitrarily large?

From <[https://www.patarnott.com/atms360/assignments\\_ATMS360\\_2026.htm#hw6](https://www.patarnott.com/atms360/assignments_ATMS360_2026.htm#hw6)>

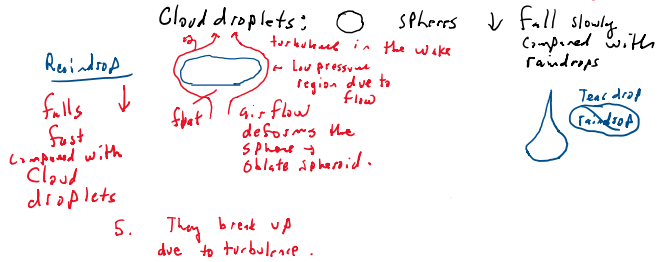


1. Raindrop diameter range 0.5mm + 4mm µm  
 Typical diameter: 2mm = 2000 microns

2. Drizzle Drops: 0.1mm to 0.5mm Diameters  
 100µm to 500µm

3. Cloud droplets: 5µm to 50µm or 100µm

4. What is the shape of raindrops as they fall?



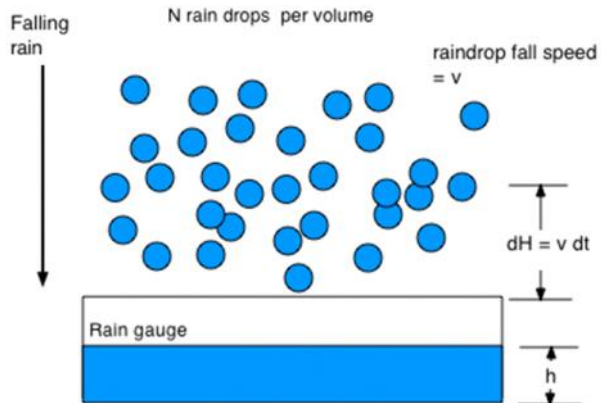
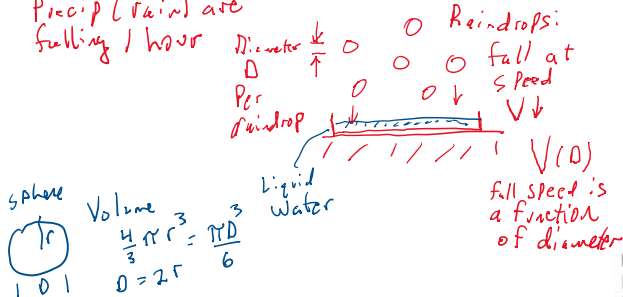
5. They break up due to turbulence.

## Local Rain Measurements:

6. What is the rainfall rate equation?
7. How does a simple rain gauge work?
8. How does a tipping bucket rain gauge measure rain? (picture from here).
9. How does a disdrometer work?

From <[https://www.patarnott.com/atms360/assignments\\_ATMS360\\_2026.htm](https://www.patarnott.com/atms360/assignments_ATMS360_2026.htm)>

6. How many mm of precip (rain) are falling / hour



h = height of rain water in rain gauge. Rainfall rate = dh/dt  
 In time dt, drops from a height dH = v dt will land in the rain gauge. Drops have diameter D. A = area of the rain gauge opening. Then total water volume added in time dt to the rain gauge is  
 $N A dH \pi D^3 / 6 = \# \text{ Rain Drops going into rain gauge} \cdot \text{drop volume}$   
 $= N A v dt \pi D^3 / 6 = A dh$

Then rain rate is dh/dt = N v π D<sup>3</sup> / 6 .

Units;

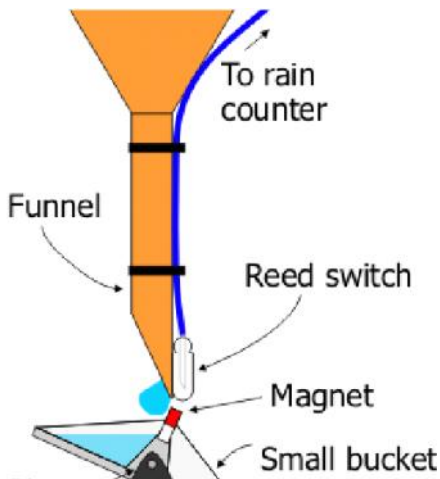
$\frac{\# \text{ raindrops}}{\text{Volume}} \cdot \frac{\text{Volume}}{\text{raindrop}} \cdot \frac{\text{Speed}}{\text{raindrops are added.}} \cdot \frac{\text{dt}}{\text{s}} \rightarrow \frac{\text{mm}}{\text{hour}}$

Rain Rate  
 $\frac{dh}{dt} \rightarrow \frac{\text{increase height}}{\text{hour}}$

$$\frac{dh}{dt} = N v \frac{\pi D^3}{6}$$

mm/hr      # raindrops / Volume per raindrop

## Tipping bucket Rain gauge



## Disdrometer

