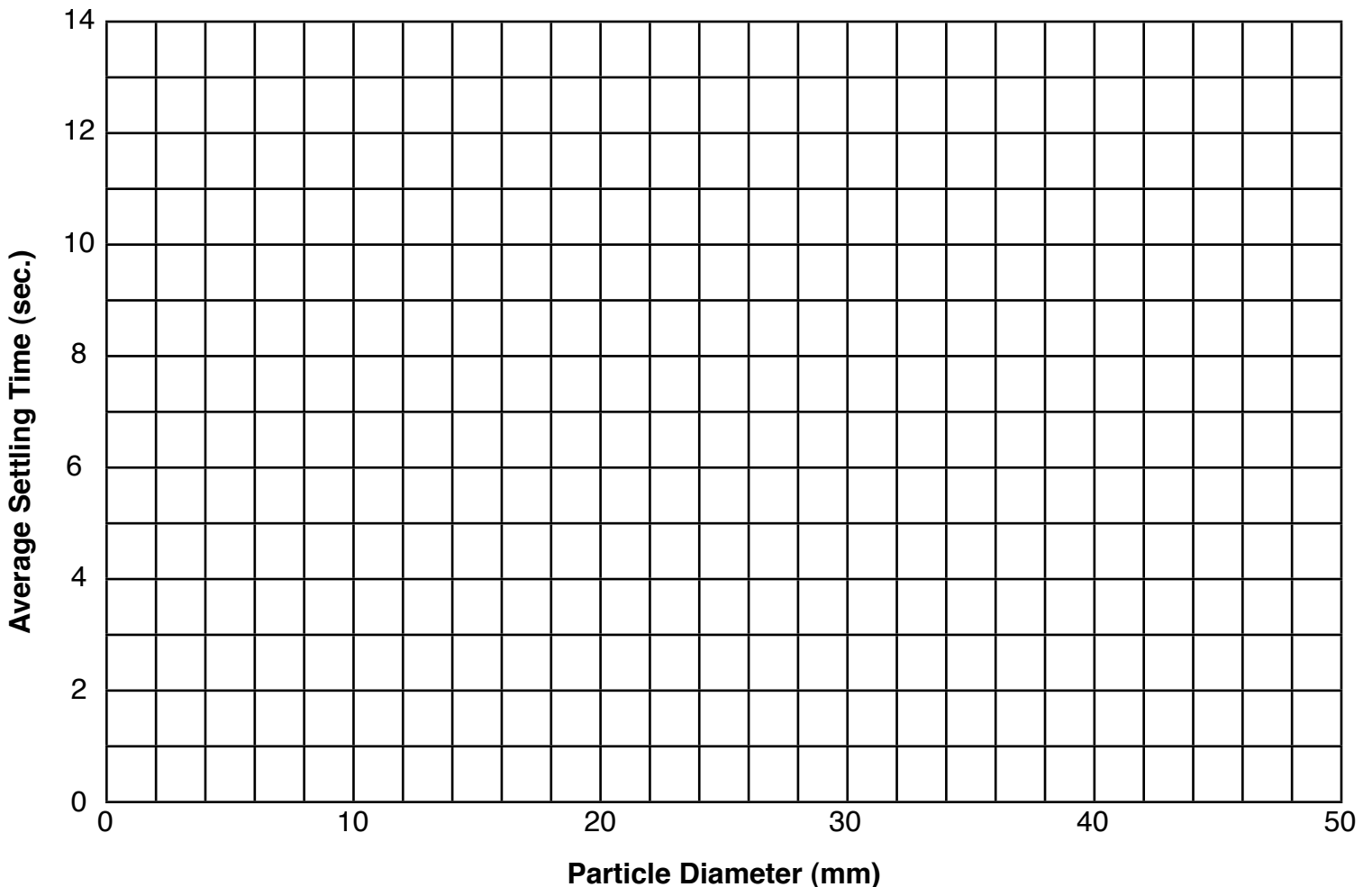


## Settling Rates/Times Lab

**EXPERIMENT #1:** A student dropped beads of various sizes into a tube of water and observed the length of time it took for those beads to settle to the bottom. He completed three trials for each size bead and recorded the settling times in the data table seen below. Begin by averaging the settling times of each trial. Then, complete the graph to represent the relationship between particle size and the average settling times based on the data given.

Bead Diameter (mm)	Settling Time (seconds)			Average Settling Time (seconds)
<b>10</b>	Trial #1 11.5 sec.	Trial #2 13.1 sec.	Trial #3 11.8 sec.	
<b>30</b>	Trial #1 8.1 sec.	Trial #2 9.8 sec.	Trial #3 9.1 sec.	
<b>50</b>	Trial #1 6.2 sec	Trial #2 7.0 sec.	Trial #3 5.1 sec.	

**Particle Size and Average Settling Time**






What is the relationship between the size of a particle and the **settling rate**?

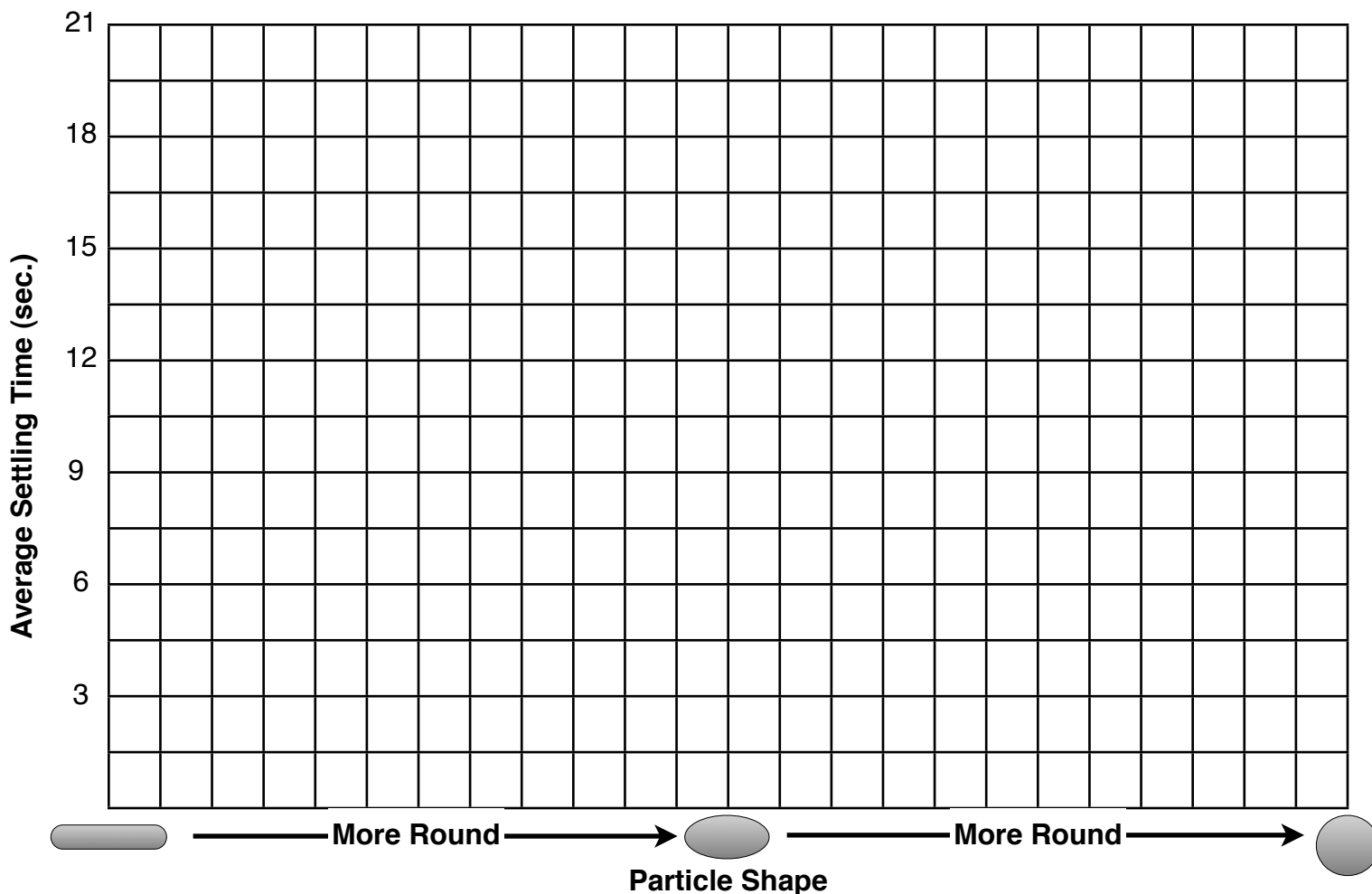
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Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

**EXPERIMENT #2:** During this experiment, a student dropped flattened beads, oval beads, and spherical beads into a tube of water and observed the length of time it took for those beads to settle to the bottom. He completed three trials for each shape of bead and recorded the settling times in the data table seen below. Begin by averaging the settling times of each trial. Then, complete the graph to represent the relationship between particle shape and the average settling times based on the data given.

Bead Shape	Settling Time (seconds)			Average Settling Time (seconds)
	Trial #1	Trial #2	Trial #3	
Flattened 	17.2 sec.	18.9 sec.	18.0 sec.	
Oval 	15.1 sec.	13.0 sec.	13.9 sec.	
Round 	11.0 sec.	11.6 sec.	10.5 sec.	

**Particle Shape and Average Settling Time**



What is the relationship between the shape of a particle and the **settling rate**?

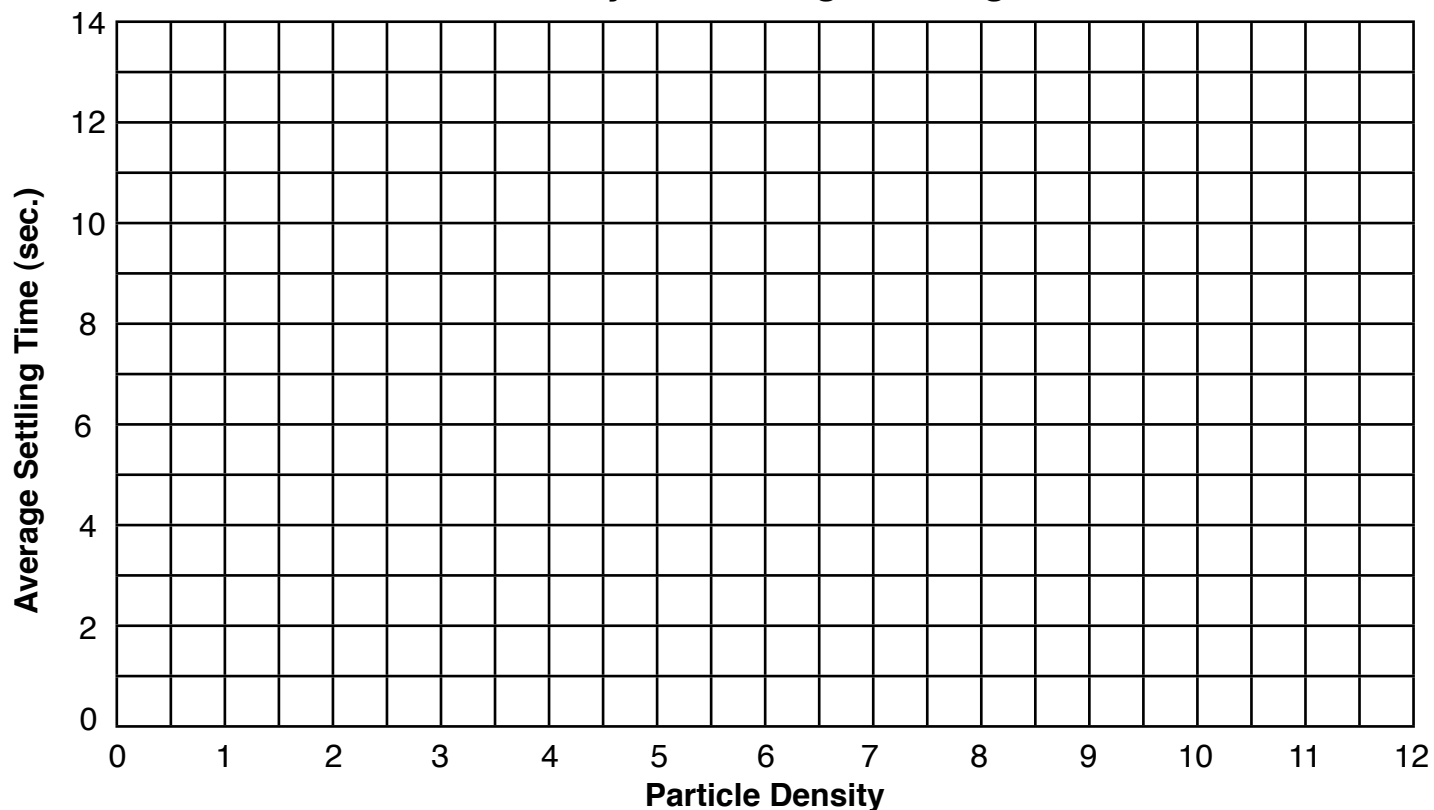
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Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

**EXPERIMENT #3:** During this experiment, a student dropped cubes of different materials into a tube of water and observed the length of time it took for those beads to settle to the bottom. The cubes were all the same size and shape, the only difference between them was their densities. He completed three trials for each material and recorded the settling times. The average settling times have been calculated for you. Please complete the graph to represent the relationship between particle density and the average settling times based on the data given.

Cube Material	Density (g/cm <sup>3</sup> )	Average Settling Time (seconds)
Copper Cube	8.5	6.0
Iron Cube	7.8	6.7
Aluminum Cube	2.7	13.5
Glass Cube	2.4	14.0
Titanium Cube	4.5	11.2
Zinc Cube	6.9	8.0
Lead Cube	11.4	2.0

**Particle Density and Average Settling Time**

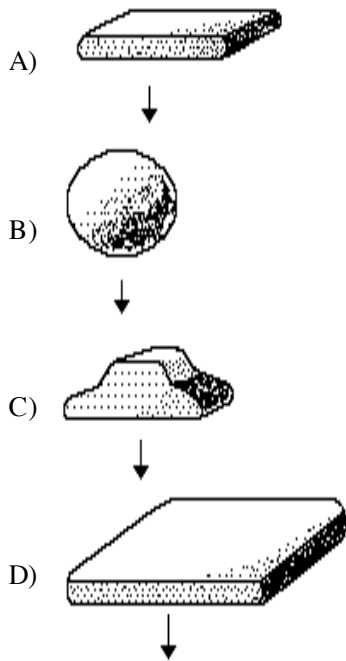


What is the relationship between the density of a particle and the **settling rate**?

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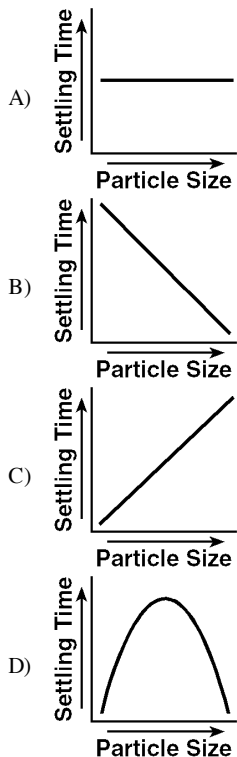
**Question #1**

If all the particles below have the same mass and density, which particle will settle fastest in quiet water? [Assume settling takes place as shown by arrows.]



**Question #4**

In a soil sample, the particles have the same shape but different sizes. Which graph *best* represents the relationship between particle size and settling time when these particles are deposited in a quiet body of water?



**Question #3**

The four particles shown in the table below are of equal volume and are dropped into a column filled with water.

Particle	Shape	Density
A	flat	2.5 g/cm <sup>3</sup>
B	flat	3.0 g/cm <sup>3</sup>
C	round	2.5 g/cm <sup>3</sup>
D	round	3.0 g/cm <sup>3</sup>

Which particle would usually settle most rapidly?

- A) A
- B) B
- C) C
- D) D

**Question #4**

Which particles are the last to settle as a river's velocity decreases?

- A) rounded sand particles
- B) rounded silt particles
- C) flattened pebbles
- D) flattened clay particles

**Question #5**

A glass sphere and a lead sphere have the same volume. Each sphere is dropped into a container of water. Which statement best explains why the lead sphere settles faster?

- A) The lead sphere has a higher density.
- B) The glass sphere has more surface area.
- C) The glass sphere has a smoother surface.
- D) The lead sphere takes up less space.

**Question #6**

The table below shows the density of four mineral samples.

Mineral	Density (g/cm <sup>3</sup> )
Cinnabar	8.2
Magnetite	5.2
Quartz	2.7
Siderite	3.9

If the shape and size of the four mineral samples are the same, which mineral will settle most slowly in water?

- A) magnetite
- B) cinnabar
- C) siderite
- D) quartz