

Balloon and Bouyancy

Learning Goals: Students will be able on a molecular level to

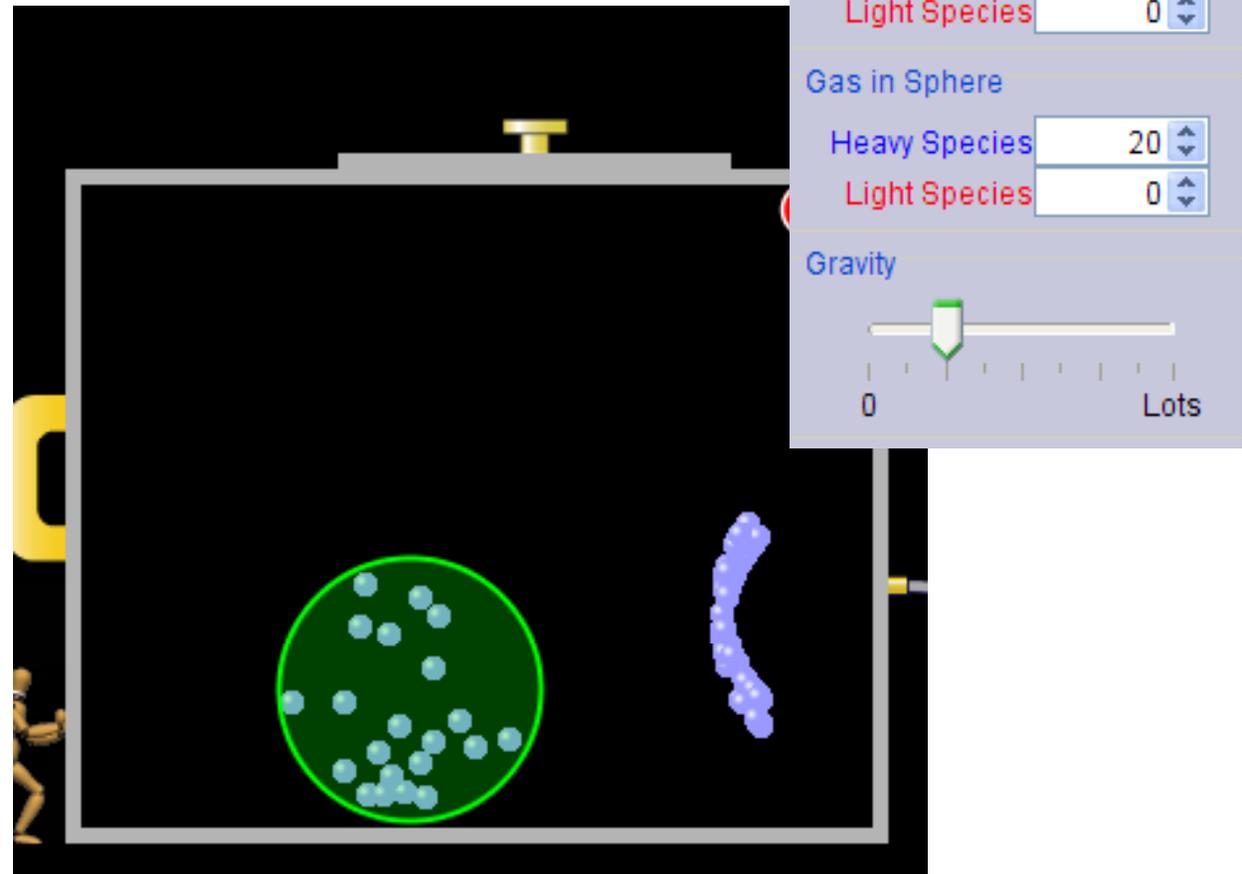
1. Explain why a rigid sphere would float or sink.
2. Determine what causes helium balloon to rise up or fall down in the box.
3. Describe the differences between the hot air balloon, rigid sphere, and helium balloon.
4. Explain why a hot air balloon has a heater.

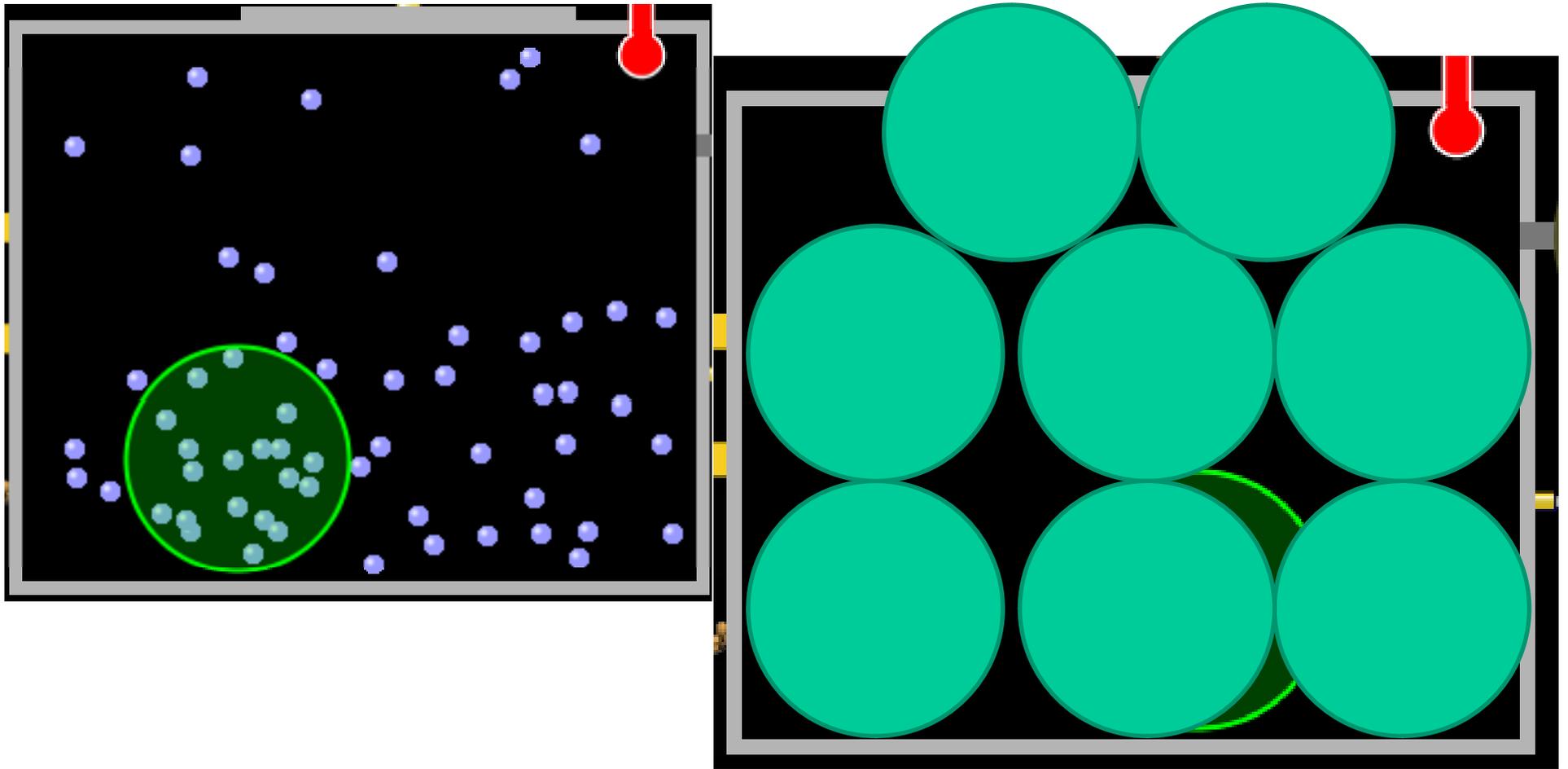
Teacher note: If you are going to use the simulation to demonstrate, remember that Reset only clears the box of particles, it does not change any settings.

Would you expect the rigid sphere to float or sink?

A. Sink

B. Float



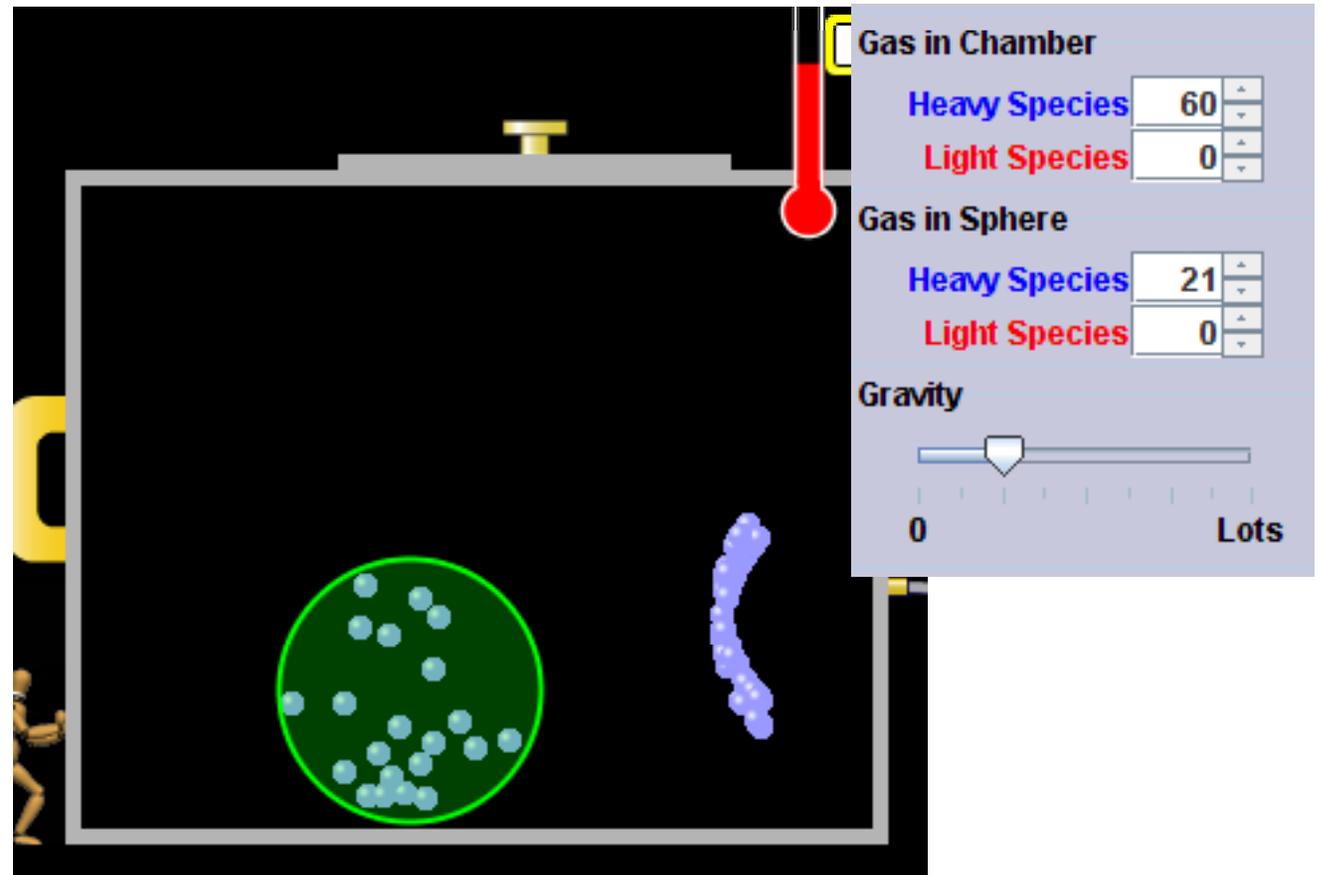


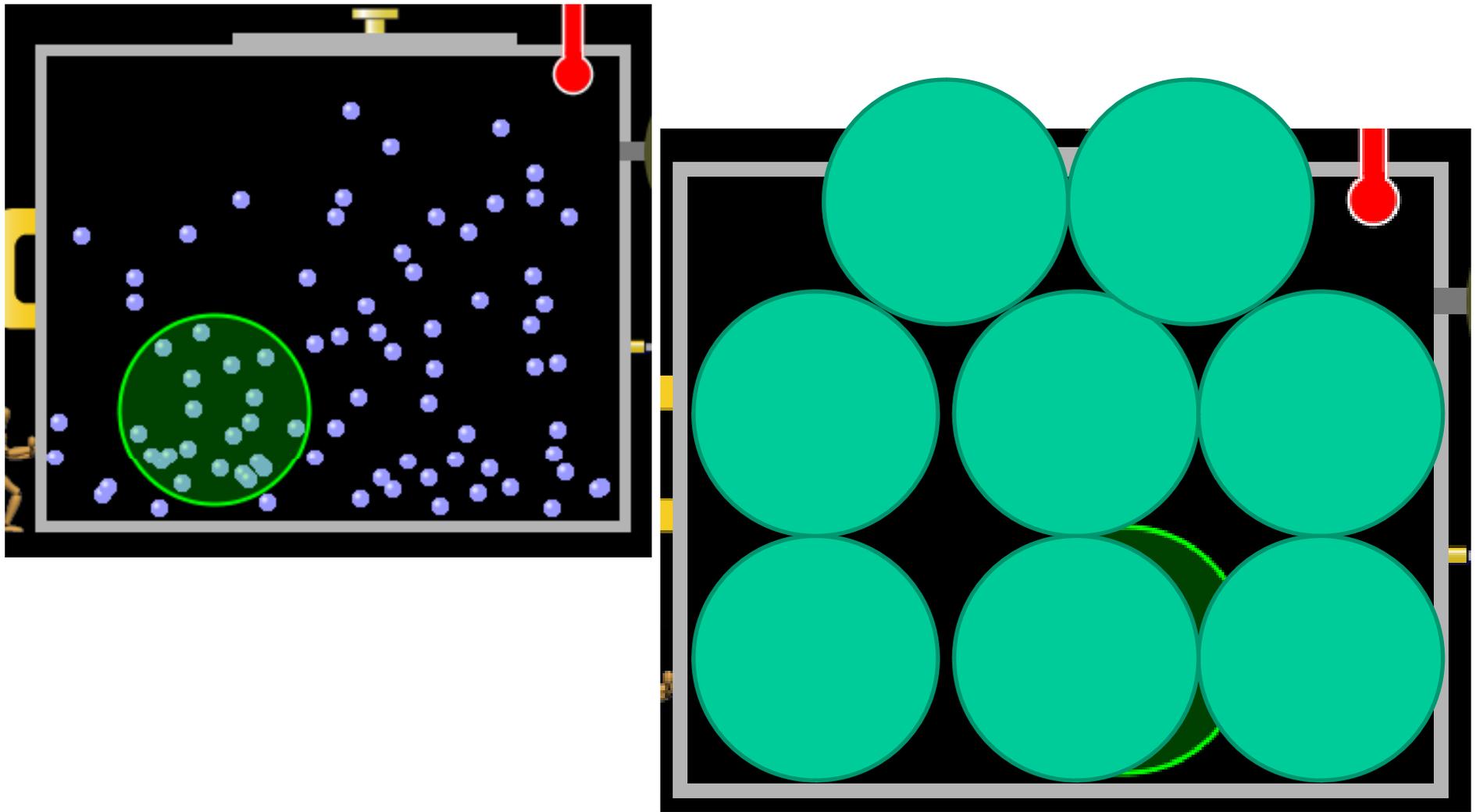
The container is about 8 times larger so the density is much greater in the sphere

Would you expect the rigid sphere to float or sink?

A. Sink

B. Float

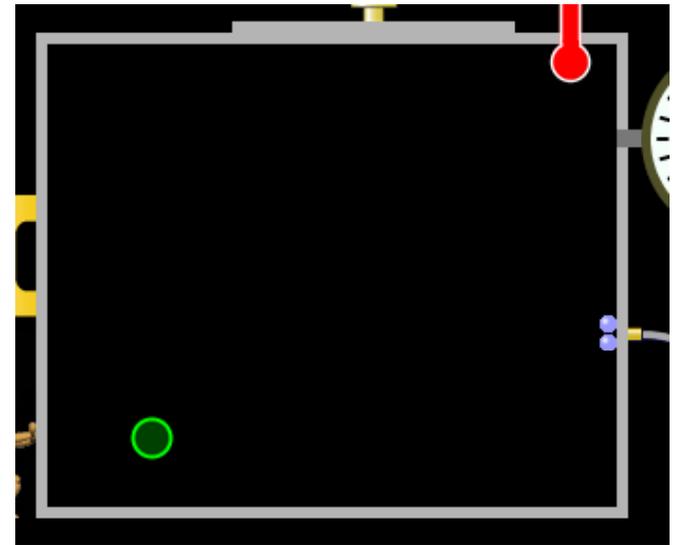




The container density would be about $60/8 = 7.5$ and $20/1$ because the box is about 8 times larger. The more dense sphere would sink

What will the hydrogen balloon do?

- A. Expand and float
- B. Expand and sink
- C. Stay the same size and float
- D. Stay the same size and sink



Gas in Chamber

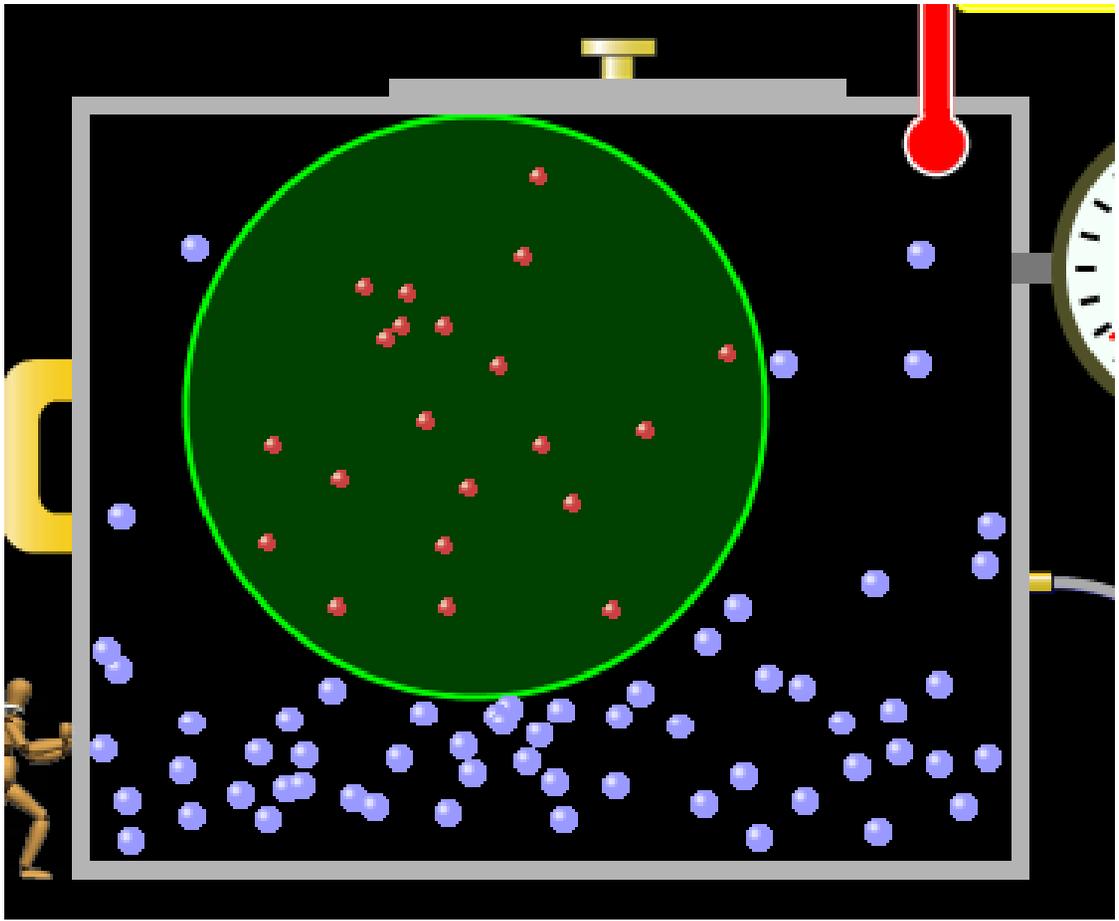
Heavy Species	60
Light Species	0

Helium in Balloon

Number of atoms	20
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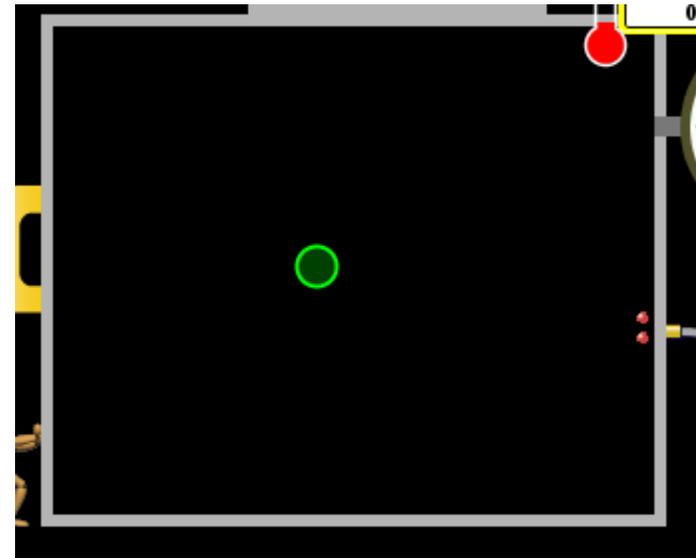
Gravity

0 Lots



What will the hydrogen balloon do?

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- B. Expand and sink
- C. Stay the same size and float
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Gas in Chamber

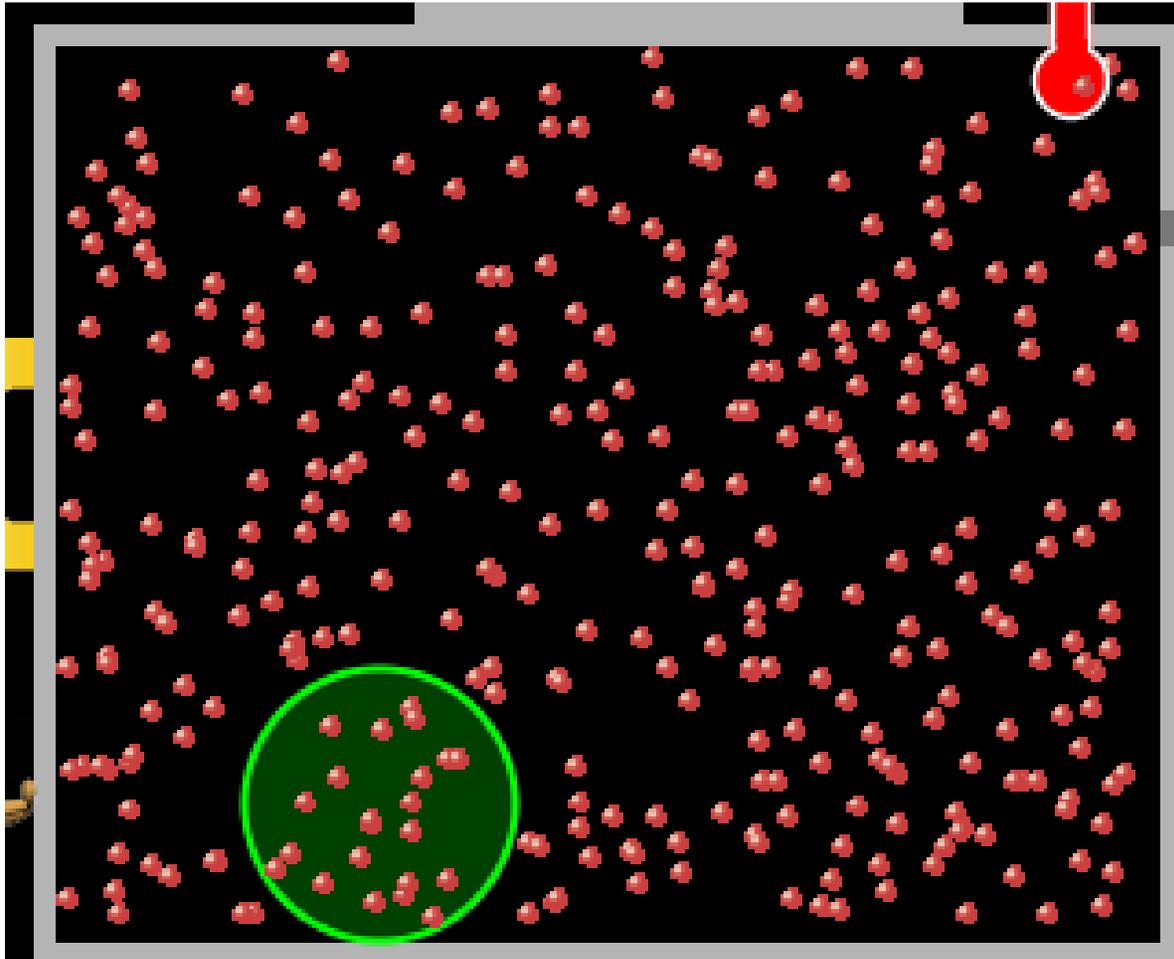
Heavy Species	<input type="text" value="0"/>
Light Species	<input type="text" value="300"/>

Helium in Balloon

Number of atoms	<input type="text" value="20"/>
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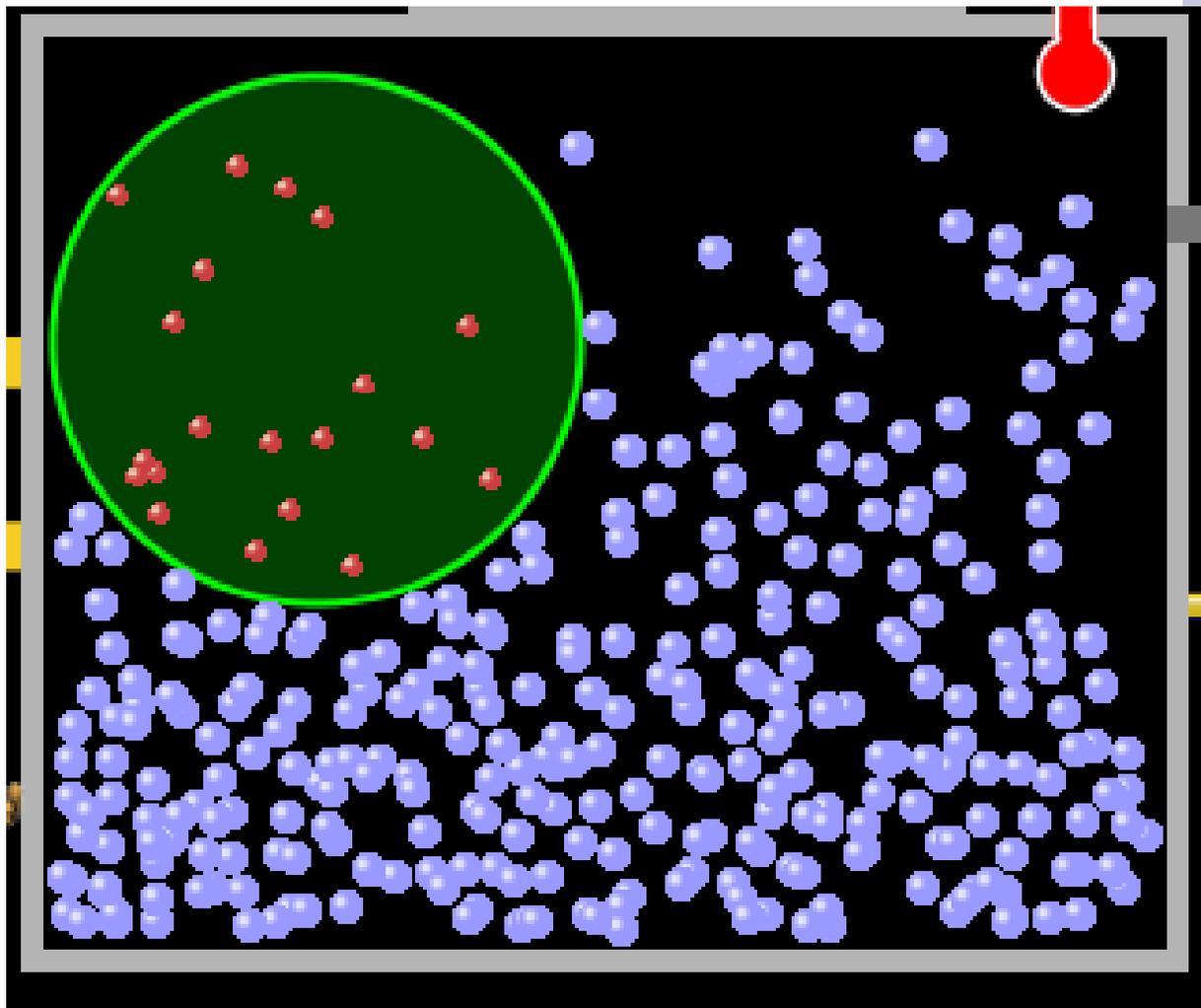
Gravity

0 Lots



Discussion: Would the results be different if the outside molecules were the heavier species?

answer



Gas in Chamber

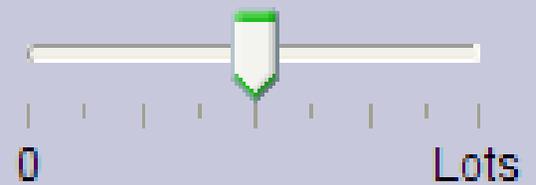
Heavy Species

Light Species

Helium in Balloon

Number of atoms

Gravity

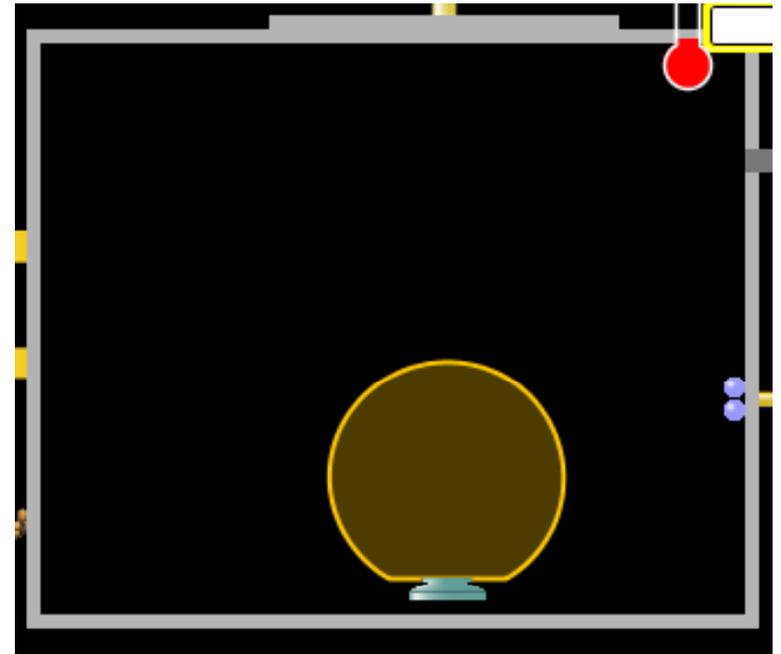


Tools & Options

Would you expect the hot air balloon to float or sink?

A.Sink

B.Float



Gas in Chamber

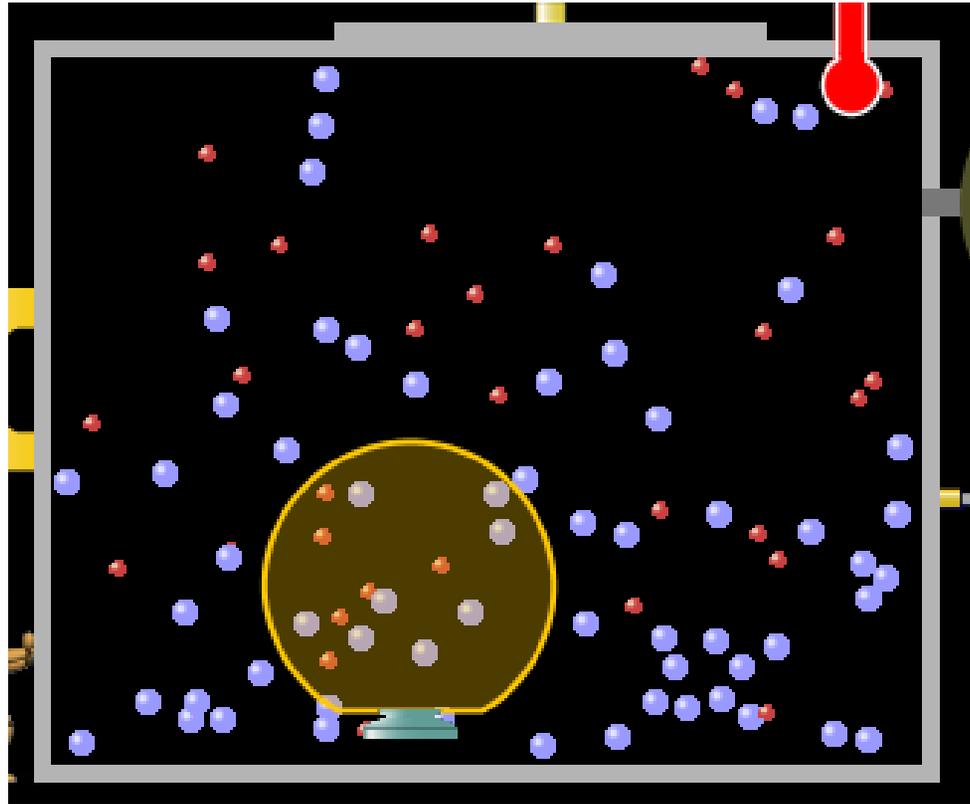
Heavy Species	61	▲	▼
Light Species	31	▲	▼

Hot Air Balloon

   Add
0

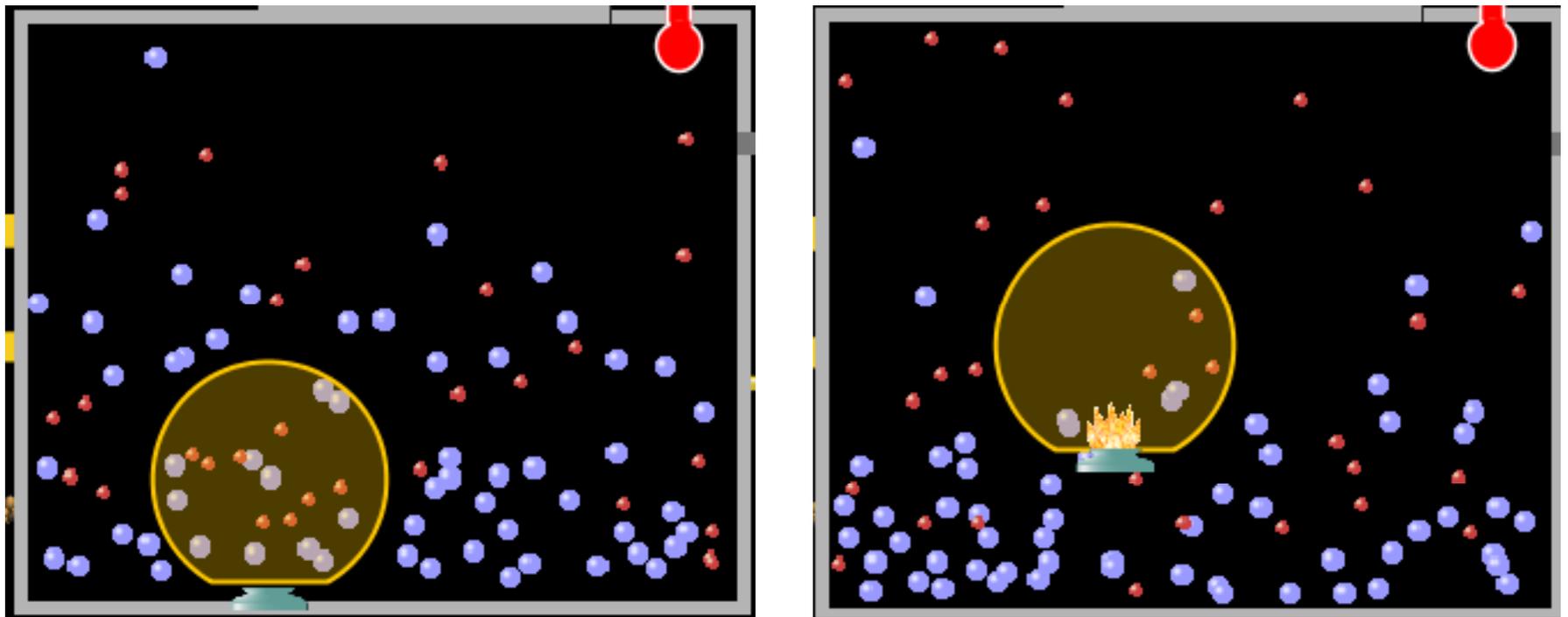
Gravity

 0 Lots



Discussion: Would there be a molecular combination that would allow the balloon to float?

Why did the hot air balloon float after the heater was used?



Discussion question