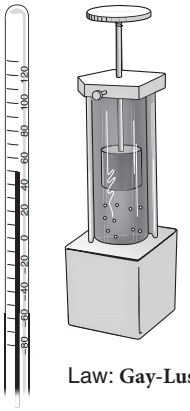
GAS LAWS

NAME SECTION

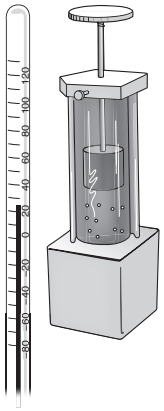
1. For pairs 1–3, fill in the blanks (calculate the value of the variables and identify which law applies), circle the correct relationship, and complete the diagrams for Questions 2 and 3.

1)



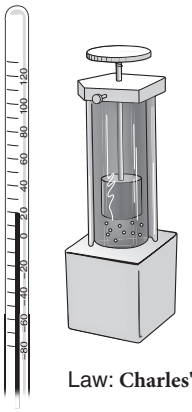
Initial:
P = 5 atm
T = 50 °C
V = 10 L

Law: **Gay-Lussac**



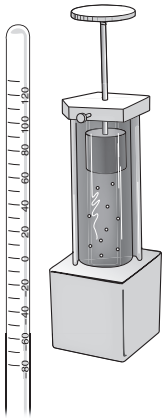
Final:
P = **4.61 atm**
T = 25 °C
V = 10 L
Direct or inverse relationship?

2)



Initial:
P = 10 atm
T = 20 °C
V = 5 L

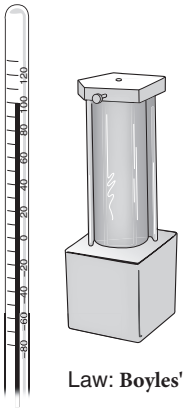
Law: **Charles' Law**



Final:
P = 10 atm
T = **899 °C**
V = 20 L
Direct or inverse relationship?

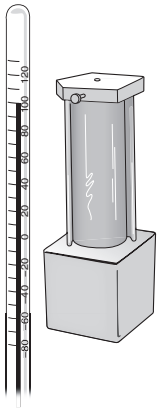
Note: Temperature is too high for this thermometer!

3)



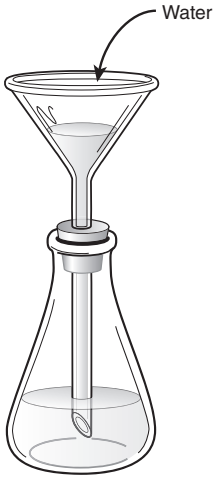
Initial:
P = 10 atm
T = 100 °C
V = 2 L

Law: **Boyles' Law**



Final:
P = 20 atm
T = 100 °C
V = 1 L
Direct or **inverse** relationship?

2. In the figure below, an Erlenmeyer flask is tightly closed by a rubber stopper containing a funnel. If we pour water into the funnel slowly, the water easily enters the Erlenmeyer flask. However, when the water level inside the flask reaches the foot of the funnel, it is no longer easy to add water. **Can you explain in your own words why this happens?**



For this physical setup, when the water reaches the foot of the funnel with the water in the funnel the remaining air inside the Erlenmeyer flask can not escape. So the volume of air inside the flask can only be compressed from the pressure exerted by the water in the funnel. The small amount of water that can be added, as shown in the diagram, will not exert enough pressure to change the volume of air in the container and additional water will not flow into the flask.

3. The label of an aerosol can below says "Pressurized container. Protect against sunlight and do not expose to temperature exceeding 50 °C." **Explain the reasons for this warning.**

The container is a constant volume environment. Temperature is directly proportional to pressure, so any increase in temperature will also increase the pressure in the container. The warning reflects a maximum temperature above which, testing has established , the particular type of container could fail, suddenly releasing the gas in an explosion.