The Archimedes principle - Taking a bath to find the density of objects

① Watch the video about Archimedes' bath. You find the link and some information on it in the box at the bottom of the sheet.

a) Write down what the king wanted Archimedes to find out and why.
b) Describe which physical quantity of the crown he had to determine and why.
c) Name the two quantities that Archimedes had to measure to find the density of the crown.

② Now you: find out the density of objects in the PHET simulation. You will find the link in the second box below. There are three categories: intro, compare and mystery. Fill in the table for each category. You can find them on the next side.

Video: How taking a bath led to Archimedes' principle - Mark Salata

Archimedes was summoned by the king to investigate a suspicious goldsmith about his crown. Did the goldsmith mix silver into it?

Link: https://youtu.be/ijj58xD5fDI

YouTube-Video

PHET-simulation on density

There are three categories that you can find below. Intro, compare and mystery. Fill in the according tables with the help of the simulation.

Link: http://phet.colorado.edu/sims/html/density/latest/density_en.html

Part 1: Intro

material	density	unit	Does it float?
styrofoam			
wood			
ice			
water			
brick			
aluminium			
custom (make up your own)			

Tab. 1 — Intro

Look at the density of water and floating objects. Why can they float whilst others cannot?

You can hold floating objects under the water with your mouse to measure their volume.

Part 2: Compare

same mass: _____ kg	volume L	density kg/L	Does it float?
blue			
yellow			
red			
green			

Use the triangle from the slides to calculate density!

Tab. 2 — Compare

same volume: _____ L	mass kg	density kg/L	Does it float?
blue			
yellow			
red			
green			

Tab. 3 — Compare

same density: _____ kg/L	mass kg	volume L	Does it float?
blue			
yellow			
red			
green			

Tab. 4 — Compare

Part 3: Mystery

There are three sets with 5 blocks of unknown material. Can you figure out what each block is made of?

	mass kg	volume L	density kg/L	Does it float?	material
1A					
1B					
1C					
1D					
1E					

Tab. 5 — Mystery

	mass kg	volume L	density kg/L	Does it float?	material
2A					
2B					
2C					
2D					
2E					

Tab. 6 — Mystery

	mass kg	volume L	density kg/L	Does it float?	material
3A					
3B					
3C					
3D					
3E					

Tab. 7 — Mystery