Material Selection from Property Data

New Regents original practice • Name: _____ Date: _____
Show your work for written answers.

A material’s measured properties help determine whether it will perform in a design. Compare materials measured under the same conditions.

1 Two panels have the same volume. Which property determines which panel has the greater mass?

(1) Density

(2) Color

(3) Surface gloss

(4) Width alone

2 Two panels have equal dimensions. One bends less under the same load. Explain what this indicates about their stiffness. [1]

Answer and work

3 Which measurement most directly helps compare how much water two dry samples take up after soaking?

(1) Change in mass after drying the outer surface

(2) Color under a lamp

(3) Length of the empty container

(4) Room temperature before soaking

4 A team compares the masses of different-sized panels to decide which material has the lowest density. Explain what additional measurement the team needs. [1]

Answer and work

Selecting a Panel for a Sample Tray

Use the information below to answer the questions.

A class tests equal-sized panels for a tray that may get wet. A panel must bend at most 4.0 mm under the test load and gain at most 2.0 percent of its dry mass in a water test. Of the panels meeting both limits, choose the one with the lowest mass.

Panel	Dry mass (g)	Bend (mm)	Water uptake (%)
P	120	3.0	1.2
Q	95	5.0	1.0
R	105	4.0	1.8
S	90	3.5	3.0

5 Which panel fails the bending requirement?

(1) P

(2) Q

(3) R

(4) S

6 Choose a panel and justify your choice using all three measured properties. [1]

Answer and work

7 How many grams of water does panel P gain in the test? Use its dry mass and uptake percentage. [1]

Answer and work

8 If water uptake is now limited to at most 1.5 percent, which panel meets that limit and the original bending limit?

(1) P

(2) Q

(3) R

(4) S