

## Activity Pre/Post-Quiz Answer Key

1. List as many properties of matter as you can. Give a brief definition of each as you can.

*shape - the outward general form*

*texture - how rough or smooth an object is*

*color - the observable color*

*odor - smell*

*lightweight/heavy - measure of mass with the force of gravity acting on object*

*volume - the amount of space matter takes up*

*stretchiness or elasticity - can be pulled into a larger form or different shape temporarily and then go back to the original form/shape*

*flexible - can move/bend when pressure is put on it*

*rigid - doesn't move/bend when pressure is applied*

*malleable - can be hammered or pressed into different shapes*

*lustrous - shiny*

*soft - easy to press, mold*

*hard - rigid*

*ductile - can be formed into a wire*

*flammability - ability of an object to burn*

*skin/eye irritant - chemically reacts with skin/eyes causing burning, itching, redness, etc*

*edible - can be eaten without causing most people to get sick, etc.*

*non-toxic - will not make someone sick when eaten/ingested*

*explosive - will break down giving off a lot of energy, causing fire, or creating noise*

*low/high melting point/freezing point - temperature at which a substance changes between solid and liquid phases*

*low/high boiling point - temperature at which a substance changes between gas and liquid phases*

*insulator - does not conduct heat or electricity; insulators keeps things at a specific temperature*

*heat/electrical conductivity - ability to transfer heat/electricity from one place/material to another*

*soluble in water - will absorb or dissolve in water*

*durable - lasts a long time*

2. Think of a material, object, or fluid. List two physical properties. Tell how the physical properties affect how we use it.

*Plastic can be lightweight so we use it in water bottles, bags, and other things that we carry around. Plastic has a low melting point so we have to keep it away from a stove, fire, etc. Thick clothes are insulators so we use them to help us not lose our body heat in winter. This is also the reason we use thick layers of cloth as potholders. Cotton absorbs water so we use it in towels to dry dishes, ourselves, etc. Metal conducts electricity so we use it for wires. Metal conducts heat so we use it for cooking.*

3. List two properties needed in a good cell phone case. How can our knowledge of properties help us create a better cell phone case?

*We need a cell phone that is a little soft so that it provides cushion when the phone is dropped. So, we want to use soft material. We need a case that prevents the screen from breaking but still is sensitive so that the touch screen can be used. Thus, we don't want a thick layer on the screen. We want cases that are the colors/designs that we like so we will use paint, etc. that we like. We want cases that are lightweight because we want to carry them so we need to make them out of lightweight material.*

4. What is a tessellation?

**A tessellation is created when a shape is repeated over and over again covering a plane without any gaps or overlaps.**

5. Draw, label and explain what you believe to be the geometric shape that would be the best example of strength related to its shape.

**Accept any answer that shows thought.**

6. How can that knowledge be used to create a better cell phone case?

**We should make the cell phone case out of that shape.**

7. What does a materials engineer do?

**A materials engineer uses knowledge of chemical and physical properties when choosing materials to design things to solve problems and help people.**

8. List/Draw the steps of the engineering design process.

