

Pre-Laboratory Engagement: Color Reflection and Absorption

Background

We can categorize materials by their appearance, like transparent, translucent, or opaque; dark or light colored; glossy or matte finish, etc. These classifications are based on how the materials transmit, absorb, and reflect light. These concepts are explained in more detail below.

When a material **transmits** light, it allows light to pass through so it appears transparent or translucent. Notice that we cannot see materials that transmit *all* light; we see what is behind the material instead. The clear glass used in most windows is a good example.

When a material **absorbs** light, it captures the energy carried by the light and transforms it into thermal energy. These materials look dark and tend to get warm when left exposed to light. Notice we also cannot see materials that absorb *all* light; we see the absence of light.

We can only see materials that **reflect** or bounce back light. The bouncing of light is similar to that of a bouncy ball in that the angle at which the light falls onto the reflecting surface is identical to the angle at which it bounces back. A mirror is a perfect example of reflection on a smooth material. Because it is so smooth, all light reflects at the same angle giving the material a shiny appearance. Materials that do not have a smooth surface, reflect light in a diffuse way. Bumps on their surface cause light to reflect in many directions. These materials appear matte.

Purpose: Your job is to determine how light is reflected or absorbed by different colored materials.

Materials

- White paper
- Flashlight
- Dispersion prism
- Construction paper (red, green, blue)

Procedure

1. Reduce ambient light (turn off overhead lights and cover windows).
2. Shine the flashlight onto the white paper and record its color in the table below.
3. Shine the flashlight into the prism. Light should come out the other side.
4. Align the white paper with the light refracted by the prism and record its color in the table below.
5. Hold a piece of construction paper so it is perpendicular to the table and do the same with the white paper about 1 foot away.
6. Shine the flashlight onto the construction paper so some light is reflected onto the white paper.
7. Record the color observed on the white paper then record which colors that are normally found in white light have disappeared, or been absorbed, by the colored paper.
8. Repeat steps 5-7 with the remaining two colors of construction paper.

	Color(s) viewed on white paper	Color(s) absorbed by construction paper
Flashlight on white paper		N/A
Flashlight through prism		N/A
Flashlight on red paper		
Flashlight on green paper		
Flashlight on blue paper		