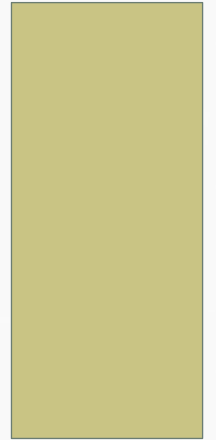


# SCIENTIFIC PROBLEM SOLVING

A COLLECTION OF QUESTIONS



# TODAY'S OBJECTIVE

- Today our objective is to apply our concepts learned in light and shadow into problem solving situations. You know you are successful if you can explain an idea and reinforce your idea with scientific vocabulary and concepts.

# EXAMPLE ONE

- You and your friend are going skiing at C.O.P. You finish the day and get into the car and your friend explains how weird their eyes feel. They think they must have got some dirt stuck in their eye. You notice they didn't wear goggles all day. What could you say?

# QUESTION TWO

- Your little sister says the moon creates its own light because it is up when the sun is down so how can it reflect the light from the sun? How do you explain this process to her?

A student was organizing a list of light sources and a list of reflections. They ask for your input. What can you tell them?

Light sources: sun, flashlight, candle

Reflections: light on the water, moon, campfire, laser pointer

Your friend said they found something really interesting during a science experiment. They said translucent objects create the darkest shadow. Even more dark than opaque objects. You disagree, how can you prove your theory?

You have always wondered why stars were less bright than the sun. Someone Told you they were old suns that are just less powerful. Do you believe them Now?

Your little sister is confused. She sees a dog in the distance and a house in the distance. The dog is bigger than the house. She is getting really scared of the size of this dog. Can you explain to her why not to worry?

You want to prove light moves in a straight line until we interact with it. You have a flashlight, laser pointer, 3 small mirrors, a prism, a convex lens and a concave lens. What is your plan to prove you can change the direction of light?

Your family buys you a telescope for your birthday so you can start tracking the stars. You ask them if the lens are concave or convex. They have no idea what you are talking about. How do you explain it to them?

A student in Grade seven was wanting to slow down the speed of light. They want to find a combination of material that will slow light down the most. What two materials would you use and why? Can you estimate how slow light would travel?

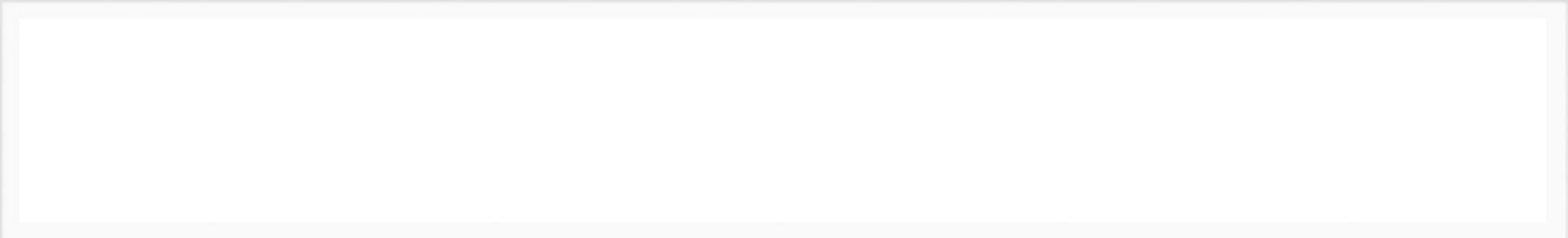
Substance	Refractive index	Speed of light in substance (x 1,000,000 m/s)
Air	1.00	300
Water	1.33	226
Glass	1.5	200
Diamond	2.4	125

A student has 5 prisms. They learned the second prism rule of how if a second prism was placed in front of the separation of light, it would be turned back into white light. They wanted to see if they could create a 5 prism rule. What do you think it would be? What is on the other side of prism number 5?

A student wants to create a wall to block all the light created from a flashlight. They have a collection of materials. How would you design the wall?

Tin Foil	White paper
Cardboard	Duct tape
Tupperware containers	Black construction paper





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# problem

You are lying on the dock of a lake on a bright and sunny day. You look out into the water and you see something shiny in the water but it is too deep to reach. You grab a stick and go to poke it. The problem is even when you think your stick is lined up, you miss the shiny object. What is going on? Your aim cannot be that bad.