Cycle 2 Week 2 Science - #24 / #26 VanCleave

#24 Mirage

-When you shine a light (turn on flashlight or phone light, or flick room lights), there are tiny light particles that are traveling through the air and space. That air and space is called **"Atmosphere".**

-And those light particles are called photons – say it with me, **"Photons"**

(Draw flashlight on board and tiny dots in front of it to represent photon particles)

-They travel at different speeds in different environments.

-For example, ***(draw stick man on board running on land)*** when you run on land, how fast can you go? REALLY fast!

-Have you ever tried to run in water? ***(Draw stick man "running" in water)*** Can you go as fast in water?

-What if you were in a giant sandbox that was filled up to your waist? ***(Draw stick man in sand)*** How fast would you go then?

-We want to test the speed of our light particles today. What are they called again? (Point to board) **PHOTONS!** Great! So let's go through our Scientific Method: ***(sing song)***

(Have a mom write out the answers on the poster as the kids discover them.)

Purpose: What is our Purpose? To discover the speed of photons in different atmospheres.

Hypothesis: What do we think will happen to our photons in air? What about in water?

Materials: What materials will we use? (Show them the materials)

Procedure: What will we do first? First we will place our coin in our bowl. Then we will slowly fill it with water.

(Do the experiment at this time)

-What do we notice about the coin before we add water to the bowl? (Add water)
-What happened once we started adding water?
-Did the coin move?
-What made the coin appear to move?
-Would this work with a different coin?
-What would happen if the water was emptied?

Results: What happened when we added the water?
-What are some differences between water and air?
-Has anyone seen the sun "hovering" above the horizon at sunset or sunrise?
Our light particles – PHOTONS – traveled at different speeds through the different atmospheres. AND when light changes speeds (like going from air to water or water to air) it CHANGES DIRECTIONS TOO! It causes the image to become distorted – or look strange.
We have a LOT of layers of atmosphere between the land and space. When the sun sets, the atmosphere is thick enough that it distorts the sun as if it were shining through water (like our coin).
So when you see the sun set – is it actually in the place that it looks like it is?

Conclusion: Photons move more slowly through water and this causes distortion of the object.

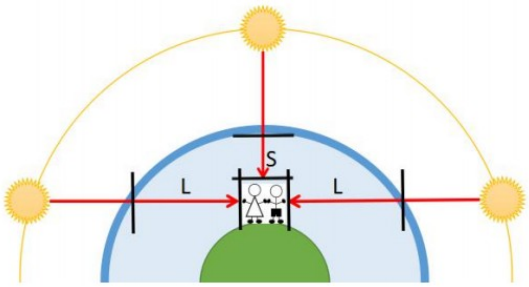
#26 Distortion

(Use what was learned in experiment #24 to draw conclusions here)

-If we were to watch the sun from sunrise to sunset, we would see it travel across the sky. Is that right? Is the SUN moving? What IS moving? (The earth is rotating – the sun is still) Can anyone tell me what the sun looks like when it is rising/setting and how it looks different than when you see it at lunchtime? (It's smaller at lunch time) I wonder why that is??

-As the earth rotates, we see the sun through different layers of the atmosphere – remember that word from the last experiment?

Draw this image (roughly) on board:



-The kids are standing on the earth. And this shows the earth's Atmosphere *(the blue circle).* What did we learn about the earth's Atmosphere *(it's thick like water).* Here is the sun at sunrise, here It is at noon *(lunchtime),* and here it is at sunset.

During mid-day *(lunch)* the sun is directly above our friends. The sun's rays – light PHOTONS – travel this far to our friends. Through this much of our atmosphere.

-During sunrise and sunset, the rays travel through THIS MUCH atmosphere (indicate thickness).

-What do you notice on our picture between these different times of day? Right! The atmosphere it travels through is THICKER at sunrise and sunset

-During mid-day, the rays don't travel through as much atmosphere – so just like our coin with NO water – the sun looks smaller.

-What will happen to the image of the sun and sunrise/sunset? It will make it look bigger!

Let's test it out!

(Place straw in empty glass. Slowly fill the glass with water to the top.)

-What do we see?

-How is this the same as our other experiment?

-Which part of the straw would be like the sun when it is rising or setting?

-Which part is like the sun when it is the middle of the day?

So the atmosphere can distort the way we see the sun!