Mind Trekkers

**Adjustable Spectacles ("Ad Specs") Lesson Plan**

**Amount of time Demo takes:** 3-5 min

**Materials:**
- Adspecs glasses
- Eye chart
- Dow Corning display
- Assortment of lenses
- Reading glasses, or used glasses
- Tape measure
- Masking tape

**Set up instructions:**
1. Hang eye chart. Place a piece of tape or other marker on the floor 10 feet from chart to ensure accurate reading. Be sure this demonstration is set up in a corner or large space such that a student can stand well in front of the table and not be in the flow of traffic.

**SAFETY!**
- Safe demo. Do be sure to handle lenses with care, however, to avoid scratches/damage!

**Lesson’s big idea**
- Some vision problems are caused by light hitting the eye at an irregular angle.
- People with perfect vision have a perfectly curved retina. The perfect curve of their eye causes light to enter the retina directly, at no angle.
- If a person’s eye is curved irregularly, light reaches the retina at an angle, causing a vision problem (such as blurred vision).
- Glasses are curved pieces of glass that correct vision problems by bending light as it approaches your eye. Glasses curve light so that it directly enters your retina when it hits your eye, instead of hitting your eye at an angle (as it would without the curved glass of your glasses).

**Elementary School Explanation:** Vision problems are caused by light hitting your eye at an angle, instead of travelling directly into your eye. Glasses curve light so that it hits your eye directly.

**Background information**
- Professor Josh Silver, in collaboration with Dow Corning, created these glasses to give out to children in need. They are a relatively inexpensive way to bring vision care to places where children may not have access otherwise.
- The lens work by injecting silicon into the lens with the plunger. Cover one eye and then the other eye and adjust until the eye chart looks correct. The owner of the glasses would make them the correct prescription, tighten the screws at the front of the lens to seal in the silicon, and cut off the plunger and tubing. For our demos, we will **not** be doing this because we will need to continually use and change the prescription for participants.

**There are two main types of vision problems, nearsightedness and farsightedness.**
**Nearsighted vision** is indicated by a (- sign) and is a difficulty seeing distant objects. Convex lenses curve inward slightly and correct nearsightedness by bending light towards the bottom/top of the lens, thus pushing light directly into the retina when it enters the irregularly curved eye.

**Farsighted vision**, is indicated by a (+ sign).- and is difficulty seeing close objects. Concave lenses curve outward slightly, and correct farsightedness by bending light toward the center of the lens, thus pushing light directly into the retina when it enters the irregularly curved eye.

**Interpreting your Child Vision results**
- If the front of the red area is on the zero, you have near-perfect vision and your eye is “perfectly” curved.
- If the front of the red area is on a number in the + zone, you have farsighted vision (difficulty seeing close objects).
- The higher in the + zone your number is, the more irregularly curved your eye is.
- If the front of the red area is on a number in the - zone, you have nearsighted vision (difficulty seeing far away objects).
- The higher in the - zone your number is, the more irregularly curved your eye is.

**Fun Fact:** About 160 Million people out of 300 million people in the US wear glasses.

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**Instructional Procedure**
1. Ask/determine if the student is 12 years old or above. Participants under 12 are not permitted to take part in this demonstration.
2. Wind each pump forward with the adjuster wheel until the front of the pump is set to +6 on both sides.
3. Instruct the participant to stand on the 10-foot line and carefully put the glasses on.
4. Ask the participant to cover their right eye with their hand, or offer to do so for them. Remind the participant not to squint!
5. With right eye covered, tell them to turn the wheel on the left side back and forth until they can see the vision chart clearly.
6. Once they have a generally clear view, ask them to look at the smallest line of the vision chart until they can read it clearly.
7. Repeat steps 4-8 with the LEFT eye.
8. Ask questions (below) and explain how the glasses work.

Assessment, Sample questions you can ask:
- What do you think causes vision problems?
- How do glasses help to correct vision?
- What is the difference between a concave and convex lens?

Clean Up
- Wet the lenses with warm soapy water. **Do not** use household detergents or soaps with cream.
- Gently rub each lens between your thumb and forefinger in a circular pattern.
- Rinse them, and pat them dry with a clean, soft cloth. Do not use Kleenex or paper towel -- a grey cleaning cloth is provided in the white “Center for Vision in the Developing World” box.
- Remove tape from eye chart and place it in the bin.
- Remove the tape line from the floor, cleaning any tape residue as you go.
- Gently wrap and lenses or props and securely pack them in the bin.

References
- [http://www.vdwoxford.org/2minuteintro.htm](http://www.vdwoxford.org/2minuteintro.htm)
- [http://www.vdwoxford.org/childvision/](http://www.vdwoxford.org/childvision/)

National K-12 Science Standards
- List by K-4, 5-8, 9-12 for each standard covered