



TeachEngineering

Ignite STEM learning in K-12

Designing Magnifiers



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Let's review ...

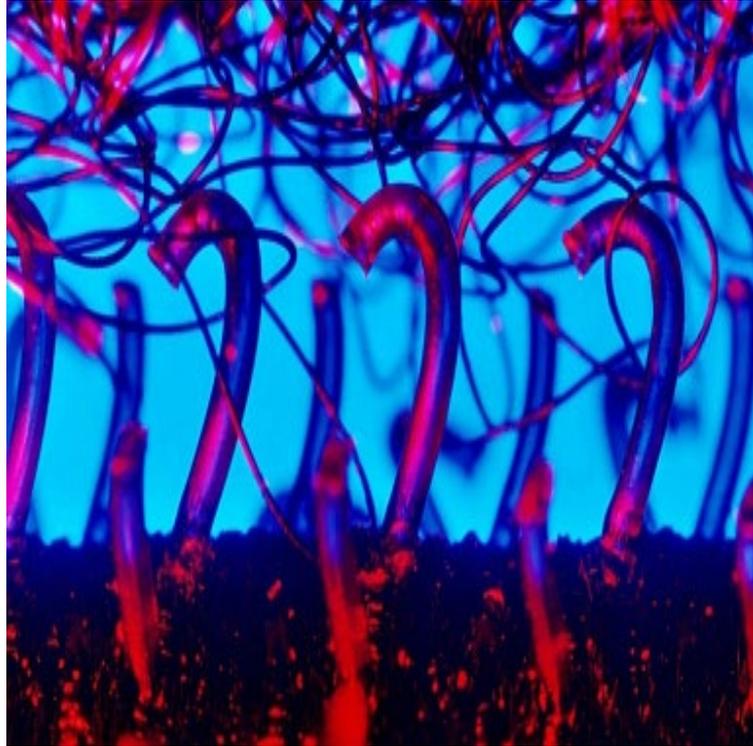
Matter - Anything that takes up space

Examples:



Can you think of any other examples?

What matter is this?



Let's review ...

Properties of Matter:

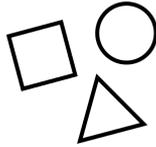
-Smell



-Size



-Shape



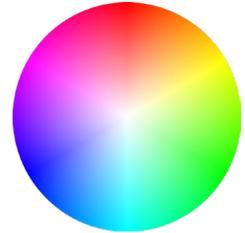
-Texture



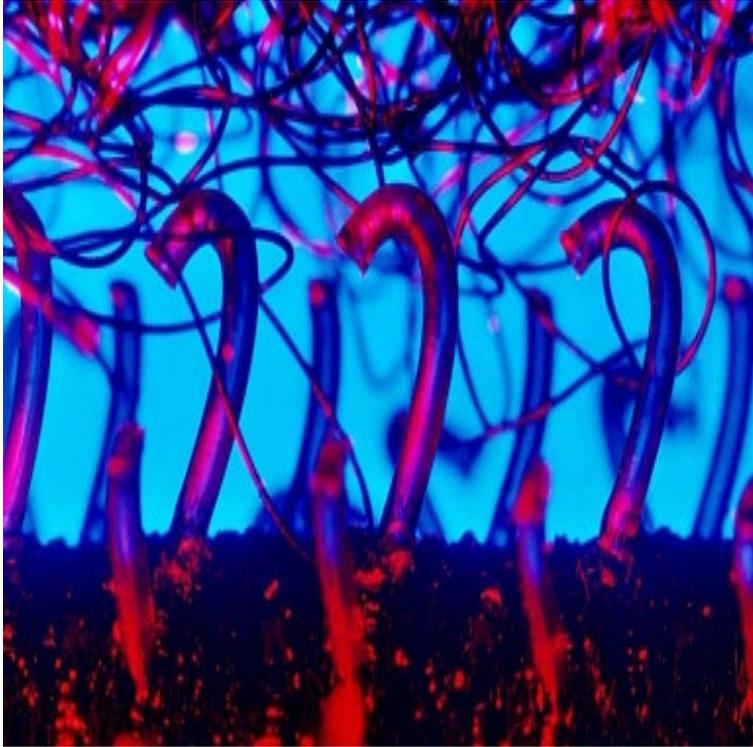
-Taste



-Color

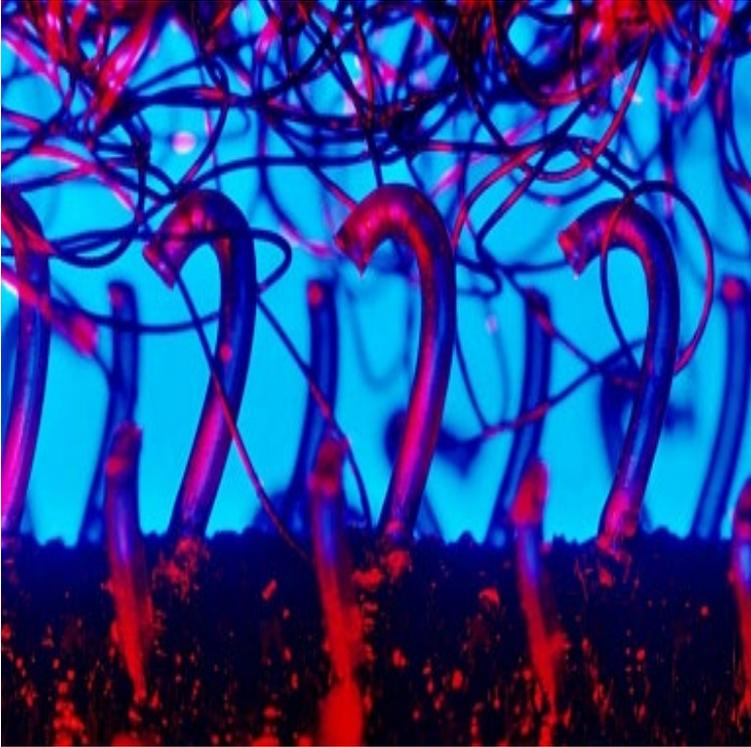


What properties of matter can you observe?



- Texture:
- Shape:
- Color:
- Size:
- Smell:
- Taste:

What matter is this????!



- This is Velcro, just like the piece on your desk.
- Observe the piece of Velcro on your desk.
- What do you notice?
- Why could you not figure out what my picture is?

What is magnification?

Magnify - to make matter appear larger

Magnification - happens when you magnify something.

It is like zooming in on an image.



What is magnification?

Let's take a look at some other examples:



Making Magnifiers

Day 2

Why is magnification important?

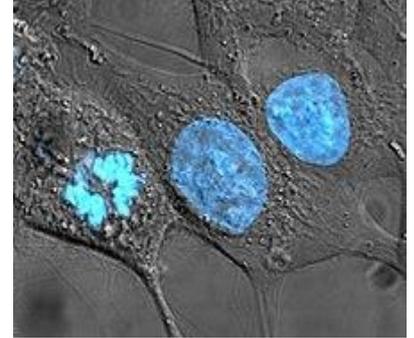
- We use our 5 senses to observe the world around us to learn and stay safe.
- Magnification helps use observe things we can not see with our naked eye.
- Did you know your eye was naked?
- When we magnify matter, we are better able to stay safe, for example lets read:
- [Do not lick this book!](#)

Five senses



Why is magnification important?

- Magnification is also important because it helps us problem solve!
- Engineers work hard to invent magnifiers or tools that can magnify matter to solve a variety of problems. Can you think of any?
- For example:
- Biomedical engineers rely on magnification technology for the evaluation of cells.
- Materials engineers rely on magnification technology in order to evaluate the properties of existing materials to assist them in making more new ones.



Our Engineering Problem

Today I need your help as engineers.

I need you to invent a magnifier to help figure out how the Velcro on my shoes is broken! The Velcro is not sticking together anymore! I can not see what is wrong with the Velcro with my naked eye, so I need a magnifier. Will you please help me? Other wise I'll have to hop around on only 1 shoe!



Materials

- Cup of water



- Pipette



- Plastic cup



- Scissors



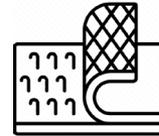
- Saran Wrap



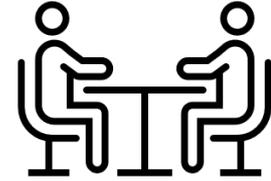
- Plastic Bag



- Velcro Square



Partner Expectations



- **Must collaborate:**
- **Make a plan, take turns, listen to ideas, use our communication script for disagreements.**



Activity Instructions

- You will have 10 minutes to collaborate with your partner to make a magnifier from the materials provided.
 - You will start by discussing your plans using active listening skills
 - Deciding who will do what, remember to take turns
 - Carrying out the plan
 - Test the design
 - Repeat with iterations
- How will you know if your invention is a magnifier?
- How will you record your observation like an engineer?
- What will you do if your done early?
- Be ready to share

Any Questions?

Go Engineers Go!

[10 Min Timer](#)

Present

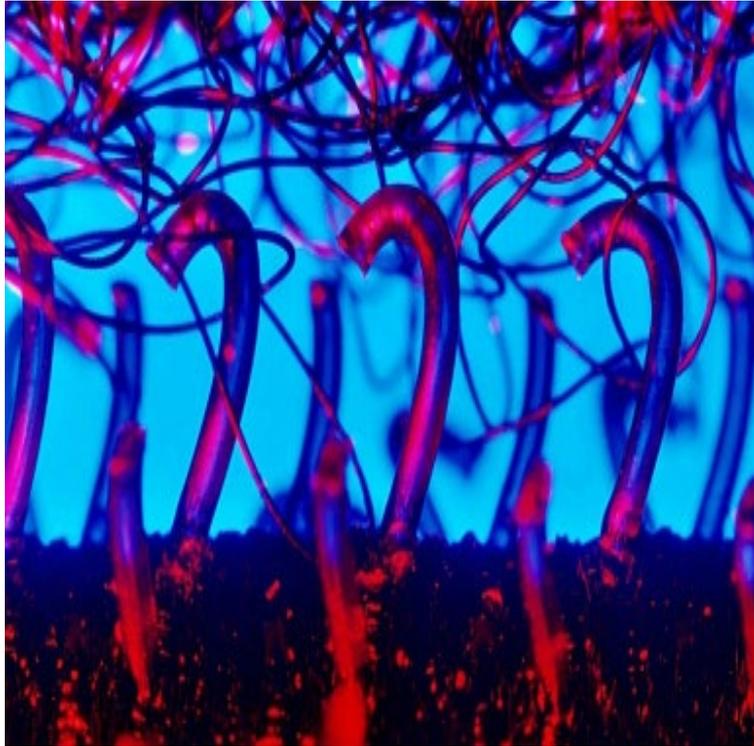
Each group will get 1 minute to share their findings

We observed that...

One more iteration...

The class design should have...

Compare



Did our magnifier make the Velcro look like this? Why or why not?

What could we do differently?

- You only had these materials this time, could we use others?
- Engineers use research to help them problem solve. What research could we conduct?