Lesson Plan 3 - Super Elements

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THEME: This is an interdisciplinary lesson which will help students remember the properties of elements. GRADE LEVEL: 5th Grade GOAL/ACTIVITY: Students will create a character

based on an element from the periodic table.



Teacher Example

DEVELOPMENTAL RATIONALE/PRIOR LEARNING: Fifth Grade students will be solidly in the Lowenfeld's Schematic Stage, making them able to understand the purpose of symbols and how they represent concepts. Symbols will be used in their character design to represent different features of their given element. Students will begin to be introduced to the Periodic Table and elements.

HISTORY/BACKGROUND: Elements are the fundamental building blocks of existence. Atoms, which are made up of protons, neutrons, and electrons, form compounds with themselves or atoms of other elements to create everything that exists. The first element, Hydrogen, contains one proton and one electron, and the last natural element, Uranium, contains 92 protons, 146 neutrons, and 92 electrons. As elements gain more protons and neutrons through nuclear fusion, they become heavier and gain different properties. One of the notable properties is whether an element is a solid, liquid, or gas at room temperature (25 degrees Centigrade). Dmitri Mendeleev, a Russian chemist, created the first Periodic Table in 1871. Although not all of the 92 natural elements had yet been discovered, he was able to leave blank spots in the chart and predict an element's properties based on those around it. Later, man-made elements such as Neptunium and Einsteinium were created by slamming particles together in a particle accelerator, nuclear reactor, or atomic bomb. The Periodic Table charts elements by grouped properties. These properties include: atomic number, atomic weight, metals vs non/metals, and a special group called the "noble gasses" which are extremely unlikely to form compounds with other elements. Elements are also given an abbreviated name of one, two, or three letters (ex. Hydrogen becomes H, Magnesium becomes Mg).

Below is the work of Kaycie Dunlap, a contemporary American artist who is currently creating a queer romance webcomic titled *B-Side You*. Her senior thesis at Milwaukee Institute of Art & Design, where she majored in animation, was *Elements: Experiments in Character Design* and consisted of a periodic table made of 72 elements. These elements are humanized with physical properties mirroring their capabilities as elements. She proceeded to finish the additional 46 elements in the following years and now provides them as educational materials free to use (with credit) for teachers and as flashcards and a coloring book. The idea dates back to her high school chemistry class when she first started sketching these characters out instead of taking notes!

STANDARDS:

Cr.1.1.5a: Combine ideas to generate an innovative idea for art-making.

Cr3.1.5a: Create artist statements using art vocabulary to describe personal choices in art-making.

Cn10.1.5a: Apply formal and conceptual vocabularies of art and design to view surroundings in new ways through art-making.

Re.7.2.5a: Identify and analyze cultural associations suggested by visual imagery.

OBJECTIVES:

Cognitive-Head: SWBAT identify their given element from the periodic table and list its properties in order to demonstrate their knowledge of the given element.

Psychomotor-Hands: SWBAT design a character based on a given element in order to visualize and understand the element's properties through symbolism and personification. **Affective-Heart:** SWBAT communicate verbally and visually how physical traits express a drawn character's personality in order to develop better media literacy skills.







- 1. Atom Eve from *Invincible* (2021-)
- 2. *Fluorine* by Kaycie Dunlap
- 3. Hydrogen by Kaycie Dunlap

SUPPLIES: Paper, drawing supplies (pens, pencils, colored pencils, crayons, markers), technology for students to do independent research (computers/laptops/iPads/etc). **RESOURCES:** Flashcards to randomly assign elements, PPT explaining basic properties of elements, chem4kids.com

TEACHER PREPARATION: Teacher will create notecards with the first 36 elements for students to pull out of a hat for a randomly assigned element. Teacher will create a worksheet for students to fill out with research about their element. Teacher will reserve time in a computer lab or library/reserve the iPad cart/do whatever needs to be done to

secure technology for student use. Teacher will prepare bins for each table of students with varied art supplies.

PRIOR KNOWLEDGE: Students will have been introduced to the Periodic Table. Students will understand visual symbolism when it comes to characters (think: superheroes). Students will have drawn the figure before in art class and will understand how to connect individual body parts (face, head, arms, body, etc) in order to create a whole person.

TEACHING | *Motivation/Spark*

Students will walk in and sit down for a PowerPoint presentation.

Okay kids, does anyone know what this is? (The Periodic Table)

And can we name any of the elements on the Periodic Table? No shouting out- I want to see raised hands!

TEACHING | Step-by-Step

Research

So, I want everyone to make a nice, single-file line for me and I'm going to get out my special hat. You're going to reach in and grab one index card. Can everyone repeat that? One! Then sit back down at your table for me.

Now, everyone will read their index cards- this is the element on the periodic table that you're going to be drawing for your project! Some of you might recognize your element, especially since earlier we named ones like Oxygen and Hydrogen. But there are some funky elements in there like Beryllium or Manganese that you might not know much about. That's why we need to do our research first! Artists put a lot of research into their work sometimes so they know why they're drawing what they're drawing.

[Have kids get iPads/laptops/etc. off of the cart or use their personal devices]

Now you're all going to go to chem4kids.com. C-H-E-M, the number 4, kids (K-I-D-S) dot C-O-M. Is everyone there? Okay, now once you get there you click on the "Elements" header- it's the one in light blue. All of your index cards also have the number of your

element on it, so you can scroll down to find the number of your element. The first 18 are in their own group, so if you have one after 18, scroll down a little to get to yours!

I have a few questions for you on your worksheets to fill out with your research, but there's also a big blank space so you can write anything you think is interesting or might be a good drawing idea on the blank space. These notes can be written however you like, as long as you can read and understand them. They're to help you, you're only going to be graded on turning them in.

Sketching / Concept Work

Now we start drawing our characters. The first thing I want you to do is brainstorm some ideas. It could be ideas for your character's hairstyle, an accessory they wear, or any part of their design. You can sketch these out and make a bunch of different versions of them- the first thing you draw might not be your favorite just yet. These are called "concept sketches". The kinds of sketches you've done before have been parts of a finished drawing, but these sketches don't need to be finished. They are just meant to show off the ideas, or concepts, we have in a quick way.

But how are you going to come up with these ideas? Well, you can look back at your research! Some important things about your element can be incorporated into a design. If you have an element that is a liquid at room temperature, you can make your character part liquid. Or if your element is associated with a color, like Cobalt, you can make part of your character that color! If you look at my character, I did a few things. My element is Oxygen, and because Oxygen is a gas, I made my character have a steamy hairstyle and feet. Oxygen is the eighth element, so my character has the number eight on their chest. In nature, Oxygen is almost always found bonded to another Oxygen atom, turning it into O2 (O for oxygen, 2 for two of them), so the eight also looks like two atoms sticking together. My character's eyes are also red because Oxygen by itself is highly explosive! There are a lot of fun things you can do with your character. My character doesn't wear any clothes because

it's made out of gas, but yours might. What kind of clothes would your element wearsomething business-like if it's a stable element, or something crazy and wild?

Once you have all the concept sketches done for your character and decide on what you're going to do for your final, you'll come over here and get your final paper. This is where you'll sketch out the whole character, from head-to-toe, and include all of the ideas you want to use from your concept sketches. As you're drawing you might get more ideas as you see everything come together- you can still add things to your character. Since you're working in pencil you can erase and change things.

Coloring

Once you've finished your sketch, you can move on to working in Sharpie. The good and bad thing about pencil is that you can erase it- this helped us in our sketching process, since we could still change and move around things, but we don't want our final drawings to be able to be erased. So what you're going to do is trace over your pencil drawing, as closely as you can, with Sharpie. While you're doing this, you can have fun with line weight- making your lines thinner and lighter where your character might have light patches and darker and thicker where they would have dark patches is a good way to make your character look interesting. I like to add thicker lines around the tops of the eyes and the top of the neck because that's where shadows tend to fall when you're looking at a person in real life.

After your lineart is finished, you can choose colors to use for your character. This is also a part of the design process, so think about the different color palettes you can use. Can anyone name a color palette for me?

Your character might look good with some contrasting colors, so if you want to do that, you can use a complementary color. But if you don't want that, think about using a complementary color. Once you've picked a color palette, make sure to color in between the lines and make your coloring neat and even. A good way to do this is to color in one direction so all of your strokes are going the same way!

TEACHING | *Closure*

As the students are cleaning up, the teacher will call on one kid to tell the class the name of their element. That student popcorns another student, who will popcorn a third student. After each student says their element, the teacher will have the students repeat the name of the element two or three times.

VOCABULARY: Element (n.): A pure substance composed of atoms of the same kind. Elements cannot be broken down into simpler substances. **Atom** (n.): The smallest unit of ordinary matter that forms a chemical element. Atoms consist of protons, neutrons, and electrons. **Periodic Table** (n.): A table to organize the elements based on their properties invented by Dmitri Mendeleev. **Fullbody** (n.): A piece of art which shows the full body of a character. **Symbol** (n.): a mark that represents an idea. **Concept Sketch** (n.): Sketches which are used to generate ideas for a finished product and are often piecemeal and representative rather than accurate. **Color Palette/Scheme** (n.): A chosen set of colors which follows aesthetic principles to create a visually pleasing piece. Common color schemes are Monochromatic, Analogous, and Complementary.

ASSESSMENT: Students will turn in three items: their initial research, their drawing, and a one paragraph write-up of how their character relates to their element. The two written pieces will be 5pts, the drawing 10pts, and having their names on their work is 2pts. Grades will be based on completion.

ACCOMMODATIONS/MODIFICATIONS/ADAPTATIONS: Students will be given the option to read a print-out rather than using a computer. Students will be allowed to write their research in any language (it is for them, not the teacher). Visual symbolism will be emphasized in the introduction of the project. Materials with grips/larger points/etc. will be provided at the tables of all students.

EXTENSIONS: Students who finish early will do research on a compound their element is included in and draw the chemical compound structure with labels and color.

CORRELATED ACTIVITY: Students will use pipe cleaners and paper to create 3-D versions of chemical compounds.

TIME BUDGET:

Class One Get Settled (5min) Intro PPT (15min) Students will randomly pick their elements and begin research (20min) Clean up/Wrap up (5min) **Class Two** Get Settled (5min) Students will work on research and begin sketching (35min) Clean up/Wrap up (5min) **Class Three** Get Settled (5min) Students will continue to work (35min) Clean up/Wrap up (5min) **Class Four** Get Settled (5min) Work Time (35min) Clean up/Wrap up (5min) **Class Five** Get Settled (5min) Students will begin write-up (35min) Clean up/Wrap up (5min) **Class Six (Minor)** Get Settled (5min) Students will turn in work (5min)

Start next lesson (30min) Clean up/Wrap up (5min)

REFERENCES:

https://www.britannica.com/biography/Dmitri-Mendeleev https://kcd-elements.tumblr.com/ http://www.chem4kids.com/