GOOD GLOW

TEACHER GUIDE



PLANNING

Here's a suggested schedule for this kit! The activities should be completed in order, but you can choose when the lessons take place over time.

ACTIVITY INFORMATION	SECTION (S)	TIME REQUIRED	DAY/ Lesson	
ACTIVITY I: BURNING CURIOSITY Observe the flame colors displayed by two burning powders before and after a new substance is formed. Time required: 1 h 30 min	 True Colors Dissolved, Not Disappeared Something New Fire Away 	90 minutes	Day 1, Day 2	
ACTIVITY 2: EXCITING ENERGY Use a model of the atom to explain different flame colors. Time required: 3 h 15 min	Friendly Flames	45 minutes	Day 3	
	Atomic Structure	45 minutes	Day 4	
	Excited Electrons	60 minutes	Day 5	
	Show What You Know	45 minutes	Day 6	
ACTIVITY 3: THE PERIODIC TABLE ELEMENTALI Josep kowstant Full schedule available with purchase				

Total time: 18+ hours

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FRIENDLY FLAMES



WARNING! Contains hazardous chemicals.

Do not eat or drink. Wash your hands after use.

WARNING! CHOKING HAZARD - Small parts. Not for children under 3 years.

WARNING! Be careful with fire and flame. Don't use in windy areas or near objects that can catch fire.

PREPARATION AND SUPERVISION

- Your student will use the candles to perform six flame tests.
- Be sure to have them record the results in the data table.
- The candles sometimes take up to 10 seconds to show their true flame color, so be patient! It also helps to have the lights turned off, if you feel you can do that safely.

MULTIPLE AGES AND ABILITIES:

If you have more than one student, allow them to take turns testing the candles in the flame. You can also have each of them try them all, but don't let them pass around lit candles; make sure they blow them out and place them back on the foil for the next person.

THINK ABOUT IT!

Question 1: How did the candles' flame test results compare to your flame test results in Activity 1?

Answer: There was a green-flame candle and a red-flame candle, matching up with the two compounds in Activity 1, but there were also four other colors.

How to Help: Remind the student of the flame test colors in Activity 1 and allow them to see that those two colors (green and red) are represented in these new observations, as well.

Question 1: What do you think is causing the different flame colors? Why? Answer: The student shouldn't have the correct vocabulary for this question yet, but

they may mention something about different substances and energy.

How to Help: Later, the student will learn that the different metal salts produce different color flame tests. The colors are caused by different wavelengths for each color, which are based on differences in energy levels in the atoms as electrons gain and lose energy.

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ATOMIC STRUCTURE

Pieces of Matter

- The student is guided to think at the particle level to understand flame tests.
- A review of the definitions of matter and the types of matter is provided in the Student Workbook.
- The following vocabulary words are introduced: atom, molecule.

Question 2: Use 3–4 sentences to summarize why flame tests of two elements can be different colors.

Answer: Flame tests are different colors because color is determined by a wavelength of light that is related to the amount of energy of the light. The amount of energy of the light is affected by the differences between energy levels when electrons fall from an excited state to a ground state, which are slightly different for different atoms. **How to Help:** *Refer the student back to the text, especially the absorption-emission diagram.*

Question 3: Make a flow chart to show the energy transfers that happen during a flame test. Types of energy may include thermal, light, motion, sound, nuclear, and potential (you won't use them all).

Answer: The flow of energy should be shown as: thermal energy (the flame) \rightarrow potential energy (an excited electron) \rightarrow light energy (the photon released) **How to Help:** Help the student interpret the absorption-emission diagram in terms of the energy involved in each step, emphasizing that the law of conservation of energy applies and the amount of energy put in must equal the energy out.

THE PERIODIC TABLE -IT'S ELEMENTAL!

So far, your student has learned that there are many differences and similarities in elements in terms of their subatomic particles. Those structural characteristics, along with the varying physical properties of elements, make organization of the elements important. This kind of organization can be done using the periodic table of the elements!

GET ORGANIZED

PREPARATION AND SUPERVISION

Your student will cut out cards with information about unknown elements. They will then use the information to organize the elements using logic and reasoning.

The properties listed on the cards are explained in the "Get Organized Information" section.

They do NOT have to put the cards in order of the traditional periodic table. Instead, they should try to notice patterns and similarities in the cards and sort them accordingly.

■ It's not necessary for the student to have a perfect system, and it's okay if not every characteristic exhibits a pattern. Even the traditional periodic table has limitations.

For your use only, here is a list of which elements each card represents, if you want to compare what your student is doing to the traditional periodic table. Keep in mind that the order of the cards is random, but you can compare them to the periodic table in the next section if you like.

SCIENCE MLOCHED

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