

LESSON PLANS

FriXionSTEM.com

Bringing science to life with the incredible, ERASABLE FriXion pens, markers and highlighters.

# **Grades K-2**

# SEE THE CHANGE PART 2: RE-CREATING BONDS



Students will learn about creating bonds by making thermo-sensitive FriXion ink reappear on different surfaces.



## **LEARNING OBJECTIVES**

After this activity, students should be able to:

- Explain why and how the thermo-sensitive ink in FriXion pens can be made to reappear
- Identify the difference between a thermo-sensitive FriXion pen and a 'regular', non-erasable pen





#### MATERIALS

- FriXion pens, Non-erasable pen, such as G2
- Paper
- Freezer, or compressed air canister (duster spray for electronics)
- Hair dryer or other heat source

#### INTRODUCTION

From the experiment above, you know that FriXion erasable pens are not just any ordinary, everyday type of pen. In fact, they are almost magic! Well maybe not magic, but they are super scientific pens. FriXion pens work unlike any other writing instruments.

By design, FriXion erasable pens, markers and highlighters incorporate science, technology, and engineering. The unique, heat-sensitive ink uses covalent bonds to help the ink to:

- Write smoothly in many different colors
- Be 'erased' completely and become invisible when it's rubbed with the eraser or gets hotter than 140°F (65°C)
- **Reappear** when the ink gets colder than 14°F (-20°C)

When you rub the heat-sensitive ink with the hard rubber eraser, heat created by friction causes the compounds in the ink to activate and make the ink clear.

Today we will try some experiments of our own.

#### PROCEDURE

#### **Before the Activity**

- Make sure you have enough FriXion pens for students to complete the activity
- Gather the rest of the materials

#### With the Students

- 1. With the class, talk through the Introduction section.
- 2. Have the students retrieve the piece of paper where they previously wrote and erased with FriXion ink (or, have them write and erase something new using FriXion pens).
- 3. Now explain to students that FriXion ink can not only can erased, but they can also make the ink reappear.
- Ask students to guess how this can be achieved.
  (Answer: expose ink to cold temperatures below 14°F)
- 5. Place paper in freezer for 15 to 20 minutes, or cool paper more quickly using the compressed air canister. Observe the effects of cold on previously erased ink. You can repeat the process with a 'regular' pen and compare. Discuss observations with the class.



- 6. Explain to students that they are going to write a surprise message to a friend in class, however, they will make it disappear before sharing it with their friend. Once their friend receives the note they must make it 'reappear'.
- 7. Share paper and FriXion pens with students. Ask them to write their message. They will use a hair dryer to 'erase'/make the message disappear.
- 8. Now they will share the message with a friend. Their friends can be encouraged to guess what was written.
- 9. Next, place the notes in the freezer or use the compressed air canister to cool the paper.
- 10. After time has passed, pull the notes from the freezer, and allow students to read their received notes.
- 11. What happened? What caused the ink to reappear?

### **DISCUSSION QUESTIONS**

- What attributes of FriXion ink make the ink reappear?
- What does this tell us about FriXion ink versus non-erasable ink?
- How could this be helpful?