What is fire?

Science experiment, discussion, drawing. 50 minutes. Ages 6 - 8

Materials: Candle, clear glass jar & lid, matches. Students: Paper and coloured pencils

Learning outcomes:

- Fire is a relationship between oxygen, fuel, heat. It can't exist without one of these.
- Practice: Observation, discussion and problem-solving, hypothesis.
- Vocabulary: hypothesis; fire triangle; friction; oxygen.
- Passive learning: The space between comic panels (called the gutters) is where time passes; narrative direction (in English) is Z pattern, left-right, down-left-right.

Pair with: Fire safety; comics units.

Notes:

- Studies show drawing while learning can improve recall, reduce stress, enhance focus.
- Air is 21% oxygen and 78% nitrogen, both chemicals; 1% is argon, CO_2 and other.
- The drawing of the fire triangle can be done on a different day; good test of recall.
- When the lid is on, the fire uses up all the oxygen in the air captured in the jar. Since it needs oxygen, and there's none left, it goes out.

Intro and demo (10 minutes)

Teacher: "We're doing a science experiment today. Part of the experiment is thinking quietly, figuring things out. Observe carefully. Let's be very quiet and observe. You will get a chance to speak later."

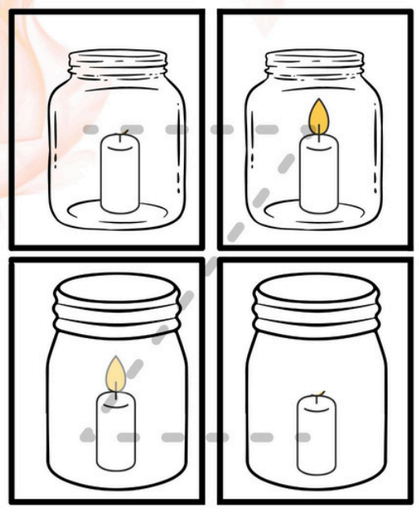
Dim lights if possible. Place candle in the jar. Light candle.

Teacher: "This is a regular candle. Watch closely."

Place lid on jar. Candle will soon flicker, then go out.

Teacher: "Think quietly about what just happened."

Organize students in small groups (2-4) .



Group discussion and comic-making (15 minutes)

Teacher: "Talk in your group about why you think the candle went out. While you talk, draw the stages as a four-panel comic: 1. Jar with unlit candle 2. Jar with lit candle. 3. Jar with lid on,candle lit. 4. Jar with lid on, candle out.

Collect hypotheses (10 minutes)

Teacher: “What are your hypotheses - your guesses?

Why do you think the candle went out?”

Students share hypotheses.

Teacher: “Great thinking! Let’s explore what happened.”

Using a candle snuffer to put out a candle

Explanation - teacher (5 minutes)

- First of all, is fire a liquid? A solid? Nope!
- Fire isn’t a thing. It’s a relationship.
- It needs three things to stay alive. Can you guess what these three things are?
- Fire needs fuel. The fuel for our fire today: candle wax (the wick draws the wax up)
- What are other fuels for fire? What else burns? (Wood, paper, oil, etc.).
- Fire also needs heat. Today that heat came from **friction:** the match across the flint strip. Rub your hand across your arm quickly. Can you feel the heat?
- Fire needs a third thing. This chemical couldn’t enter the jar with a lid on. Any ideas?
- The third thing is oxygen. Oxygen is part of air. If fire can’t get air, it can’t get oxygen. Fire needs oxygen!
- Optional: When people snuff a candle or smother a camp fire with sand or dirt to put it out, this blocks air/oxygen
- .[If a child asks why blowing on a candle can put out a candle, it’s a lot of cool air at once and displaces the heat; it can also detach the flame from the fuel (wax in wick).]

Draw the fire triangle (10 minutes)

Teacher: “So, three things act together to make fire: oxygen, fuel and heat. What shape has three sides?”

Teacher draws large triangle to show the class.

“I’d like you to draw a triangle like this. A big one. Then draw a second triangle inside it, like this. Now we’re going to colour the bottom side brown for fuel. And the right side red, for heat. And the left side blue, for…? And in the centre… what do these three things make? What is the chemical reaction? Fire! Let’s draw the fire. This is the fire triangle!”