

Fortune Telling Fish



Is there a scientific basis to the Fortune Telling Fish — or can it really tell your fortune? Have your students try the fish and then **hypothesize** about how it works and **design an experiment** to test their hypotheses.

Most students come up with one of the following hypotheses:

The fish moves in response to

- body heat
- light
- air movement
- static electricity or
- by absorbing chemicals from the skin (salt, oil, water).



Procedure

1. Remove the red cellophane "Fortune Telling" Fish from the small plastic envelope.
2. Place the fish in your hand and observe the fish for at least 30 seconds. Write down your observations and what the back of the envelope says about you.

Observations: _____

Personality: _____

3. Repeat this in another person's hand and observe.
4. Discuss the reason for the fish's movements in your group and form at least two hypotheses to account for the fish's behavior. In science, it must be a TESTABLE hypothesis. This means that we should be able to design an experiment to see whether or not our hypothesis is valid.

Hypothesis: 1. _____

2. _____

Design a simple experiment that will test your hypothesis. Your experiment should have an EXPERIMENTAL GROUP and a CONTROL GROUP. List the materials that you will need to conduct your experiment.

5. The item being tested in the experiment is called the VARIABLE, the untested comparison group is called the CONTROL. A good experimental design will only test one variable at a time.

Here is an example of an experiment design:

Variable	Experimental			Control
	Action	Fish 1	Fish 2	Fish 3
Heat	Place fish on paper close to mild heater / sun			
Moisture	Wet a paper towel with 3 drops of water and place fish on towel			
Light	Place fish on paper under desk lamp			
Air	Place fish on paper in draft from fan			
Electricity	Place fish on paper, rub a balloon on hair and bring close to fish			

Materials:

Fortune Telling Fish in plastic wrapper (cellophane fish)
 Water, Paper towels, desk lamp, fan, heater, balloon

Observe, record and discuss

Make careful observations of the movement of the fish. **How quick** it responds is important too. For instance: A fish in the sun may curl too but how does the tempo compare with the curling on the hand and wet towel? Discuss the influence secondary effects have on your results such as the evaporation of moisture by heat in the sun.

Conclusion:

The cellophane fish curls and twists primarily because it absorbs moisture from sweat glands in the hand and subsequently loses water due to evaporation. The fish is made from a cellophane polymer that is hygroscopic, ("Hygro" means water and "scopic" meaning to view or find.)

As water is absorbed into the cellophane fish, the water moves through small pores in the cellophane by a process called capillary action. The side of the fish touching the hand absorbs more moisture and the cellophane begins to swell causing the fish to curl up. The heat of your hand causes some of the water to evaporate. The lightness of the cellophane makes the fish very susceptible to air currents, which adds to the "dancing" effect. As people are different, the absorption/evaporation process happens at a different rate.

When the fish is placed on a warm **dry** surface, it flattens out since the moisture evaporates and no new moisture is added. Placing the fish on the wet paper towel causes the fish to curl as it did in the hand because it once again absorbs water.

References

1. Teaching Chemistry with Toys, McGraw-Hill & Terrific Science Press, Center for Chemical Education, Miami University, Middletown, USA
2. Joyce Brumberger, Florida Polymer Ambassador, 2004, Polymer Ambassador Web Site: www.polymerambassadors.org

