|  |  |
| --- | --- |
| **Grade** | 10 |
| **Title** | To determine the mass percentage of water imbibed by raisins. |
| **Type of Feature** | Experiment |
| **Reference** | <http://ncert.nic.in/ncerts/l/jelm103.pdf> |
| **Exp Number** |  |

**Instructions:**

|  |
| --- |
| **What must an Experiment script include:** |
|  |
| Tight academic concept linkage |
| Aligned to a cluster of related concepts that come together |
| Disclaimer saying ‘don’t try this at home’ in case the experiment is sophisticated |
| Approximately 2 minutes long video |
| Must cover textbook experiments |
| Set in a lab setting for the most part |
|  |
| **Script must have the following parts to its structure:** |
| What’s the big question? |
| Followed by a statement of the problem/question/issue brought up linking the concept to the curriculum |
| Science /math detail to explain phenomenon |
| Materials required |
| Procedure in detail |
| Detailed explanation for the learning behind the activity |
| Summary slide/recap |
| Variations of the activity for the student to try |
| Last bit for anchor to sign off |
| Knowledge graph linkage to be seen at the end |
| An interactive piece like notes that the student can take down? |

**Experiment title:**

To determine the mass percentage of water imbibed by raisins.

**Materials required:**

List of all the resources/materials/props required to execute this experiment

1. Beaker of water (50 mL)
2. Thermometer
3. Physical balance with weight box
4. Pair of forceps
5. Piece of blotting paper
6. About 20 raisins

**Script:**

|  |  |  |  |
| --- | --- | --- | --- |
| Frame | Voice-over | Text on Screen | Design Insights |
| F0 | Have you ever set dry dal out to soak in water overnight? And noticed that in the morning, the water level has gone down, and the dal has gotten all soft and fat? |  | *Show the before and after* |
| F1 | We love the word Imbibition, it means “to soak up knowledge.” Imbibition is pronounced ImBIBition and not ImBYEbition, which is a little confusing. But it’s also really fun to say. *[spoken very fast]* Imbibition Imbibition Imbibition. | **Imbibition**  From **imbibe**: “to soak up knowledge” | *Narrator* |
| F2 | *[much slower]*  What exactly does it mean?  *[normal pace]*  Imbibition is a special kind of diffusion.  And what’s diffusion?  Diffusion is when something moves from an area of high concentration to an area of low concentration. | **Diffusion**: when something moves from an area of high concentration to an area of low concentration. | *Animation showing general idea of diffusion* |
| F3 | In Imbibition, the thing doing the moving is water -- we’re going to call that the **imbibant**. The area which has a high concentration of water is this beaker, and the area which has a low concentration of water is the inside of these yummy but very dry raisins. And we’re going to call the raisins the **absorbant**. | **Imbibant**: the water  **Absorbent**: the raisins | *Narrator* |
| F4 | So the plan is to put the raisins in the water, and measure how much of the water the raisins imbibe. | Aim: To determine the mass percentage of water imbibed by raisins | *NarratorNarratorNarrator* |
| F5 | The materials required for the experiment are: | Materials Required: |  |
| F6 | A 50-milliliter beaker of water (though actually you can just use a regular drinking glass), | Beaker of water (50 mL) | *Show item* |
| F7 | a thermometer, | Thermometer | *Show item* |
| F8 | a physical balance with weight box, | Physical balance with weight box | *Show item* |
| F9 | a pair of forceps (though you could also manage with a spoon), | Pair of forceps | *Show item* |
| F10 | a piece of blotting paper | Piece of blotting paper | *Show item* |
| F11 | And of course our raisins. | About 20 raisins | *Show item* |
| F12 | So here’s what we have to do. Select about twenty raisins. You want to make sure they’re clean and dry and that they’re about the same size.  Weigh them using a physical balance and note their combined mass. |  | *Show the narrator* |
| F13 | We’ll call that number m one. | Initial mass: *m*1 = X | *Show the number on the balance* |
| F14 | Keep the raisins in the water for about an hour. | Animate a clock face moving one hour | *Narrator performs the experiment* |
| F15 | An interesting thing to do here is to note the temperature of water in the beaker. That’ll be room temperature, which is usually about 20 to 25 degrees Celsius, depending where you live. You can try repeating this experiment later with the same variety of raisins but at a different water temperature, and see if your result might be a little bit different. | Temperature *θ* = 25°C | *Narrator performs the experiment. Something about this shot should indicate that it’s an aside, outside the main flow of the experiment* |
| F16 | But anyway. Using forceps, remove the swollen raisins from the beaker. Roll them gently on the blotting paper to remove the water sticking to their surface. |  | *Back to the main flow.*  *Narrator performs experiment.* |
| F17 | Finally, weigh the swollen raisins to find their final mass. We’ll call that m two. And look at that! They started out weighing X grams, and now they weigh Y grams. So these 20 raisins have imbibed a combined Y-X grams of water. | Initial mass:  *m*1 = X g  Final mass:  *m*2 = Y g  Mass of water imbibed:  *m*2 – *m*1= Y-X g | *Narrator performs the experiment -- close up of balance* |
| F18 | But we want to find out the PERCENT of mass increase. So we have to do a little quick math.  The percent increase of mass is equal to the mass of the water water imbibed divided by the initial mass, and then multiplied by 100. So we take *m*2 – *m*1, which is Y-X, and divide it by *m*1 , which is X, and then multiply all that by 100. Which if you work it out comes to Y-X/X \* 100 percent. |  |  |
| F19 | So there you have it. And just as these absorbent raisins have imbibed the imbibant at a temperature of Z degrees Celsius and increased their mass by Y-X/X \* 100 percent, we hope that you, by watching this video, have imbibed a bunch of knowledge and are now smarter by Y-X/X \* 100 percent.  *[spoken very fast]* Imbibition Imbibition Imbibition |  | *Perform the procedure* |
| F21 | Until then…  Keep Learning! | Keep learning! |  |