



Teacher's Guide for:  
**Exploding Bubbles**

Note: All activities in this document should be performed with adult supervision. Likewise, common sense and care are essential to the conduct of any and all activities, whether described in this document or otherwise. Parents or guardians should supervise children. Rock-it Science assumes no responsibility for any injuries or damages arising from any activities.

**NOTE:** This is the transcript of a lesson that was videotaped during an actual Rock-it Science class with real students, not actors. The students' brainstorming comments are included on the video, but are not transcribed here because they're not part of the lesson presentation.

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Exploding Bubbles  
A Rock-it Science Lesson  
Filmed July, 2009

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## Experiment Recap: "Exploding Bubbles"

- Show students the device that makes hydrogen and oxygen bubbles from water.
- Refer back to the story: The Micky Mouse ears represent hydrogen, because there are two hydrogen atoms in each water molecule. The heads represent oxygen, because there's one oxygen atom in each water molecule.
- Instructor puts some dish soap in a 2-oz. plastic souffle cup.
- Poke the soap with the end of the tube to create bubbles.
- Have an assistant ignite the bubbles with a butane lighter.
- Repeat the experiment, making bubbles in the Instructor's hand instead of the cup.
- Have the students line up to have an explosion in their hand. The Instructor puts the soap in their hand and makes the bubbles, and an assistant ignites them.
- Students may opt to wear earmuffs.



The Bubble-Making Apparatus



Making Soap Bubbles



Igniting Bubbles in Hand



Igniting the Bubbles

## ***Equipment List: "Exploding Bubbles"***

### **Items needed for Instructor:**

- Battery Charger
- Plastic Jar apparatus for producing hydrogen bubbles
- 2-oz Plastic Souffle Cup
- Liquid Dish Soap (a few drops)
- Butane Lighter
- Paper Towels
- Red Devil Lye (very small amount -- see Prep video)
- Vinegar (in case lye solution spills)

### **Items needed for Students:**

#### **Consumables (per student):**

- None

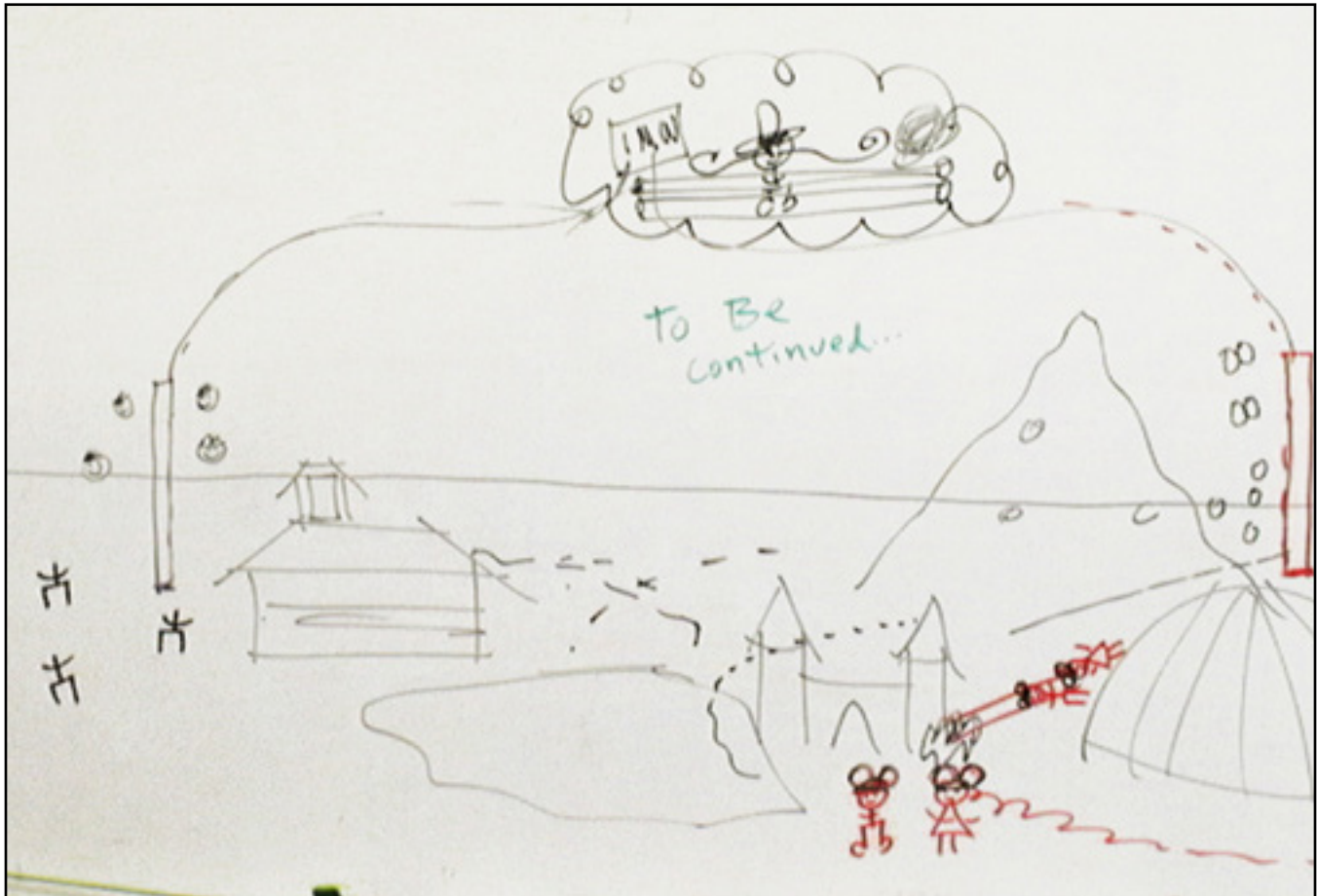
#### **Other:**

- Ear muffs

### **Prep Work:**

- Inspect apparatus for making hydrogen bubbles to make sure it's working properly.
- (For detailed instructions on building the bubble-making apparatus, see the Prep video on the "Exploding Bubbles Lesson Video" page of our Teacher Community web site.)

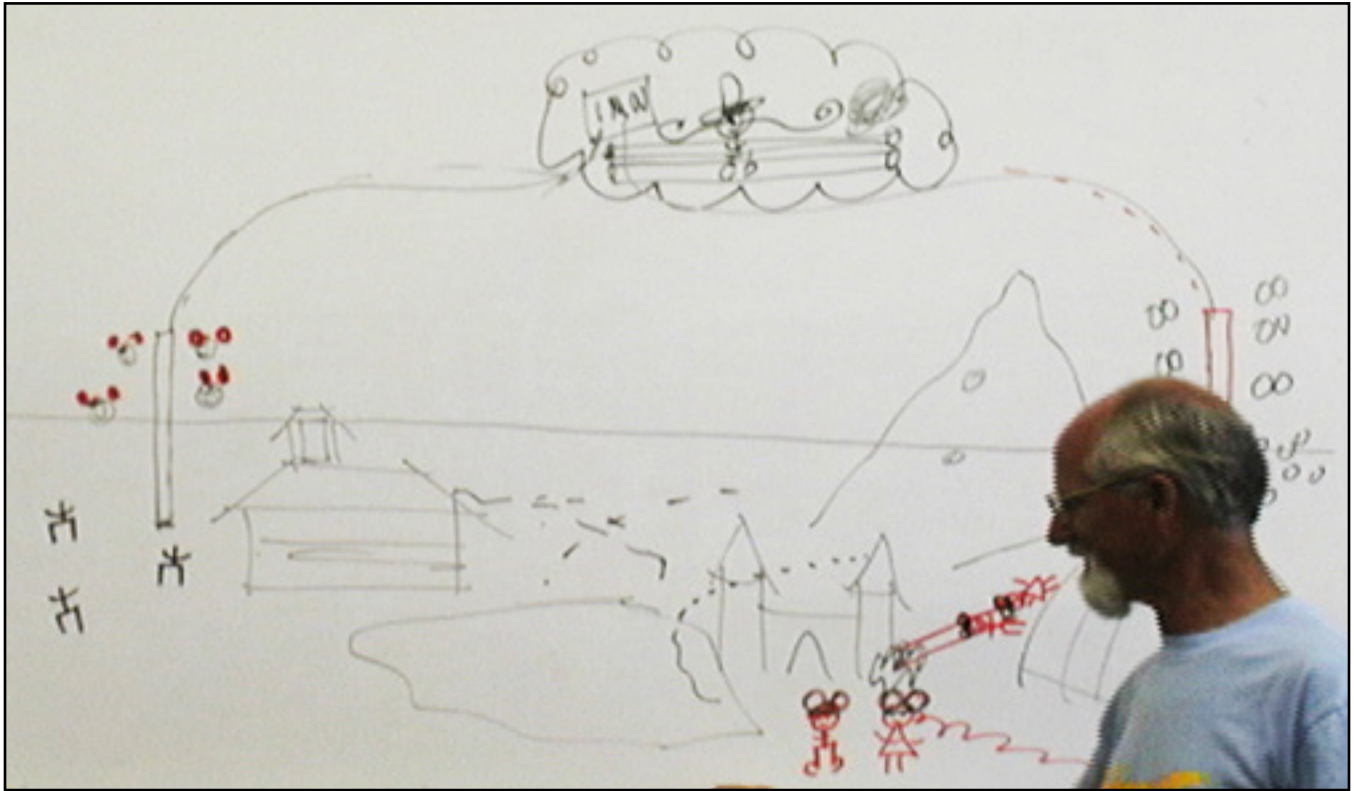
## Story Recap: "Evil Mister Fred Attacks Disneyland"



### Part 1:

- Evil Mister Fred has a thousand tickets to Disneyland. He sends them to people (including Jack and Jill), along with a pair of Mickey Mouse ears.
- When the people put on the Mickey Mouse ears, they can't get them off, but they go to Disneyland anyway.
- Evil Mister Fred is flying over Disneyland on his cloud. He has two telephone poles, a bunch of wire, and a million-watt generator.
- He drops the two poles at either end of the park and connects them with wires to his generator.
- When he turns on the power, people start moving faster and faster toward the first pole. They hit their heads on the pole so hard, the ears come off their Mickey Mouse hats, join together like butterflies, and float around the pole.
- Then they start moving toward the other pole. They hit it so hard, their heads (with the Mickey Mouse caps) fall off and float around the pole, while their bodies are running around below.
- When Jack and Jill started to move toward the first pole, Jack got tangled in Jill's hair, and Jill's hair got tangled in a bush, so they were stuck there.
- Jack has an idea for how to save people, but Jill thinks it's too dangerous.

## Story Quick Recap (cont.)



### Ending:

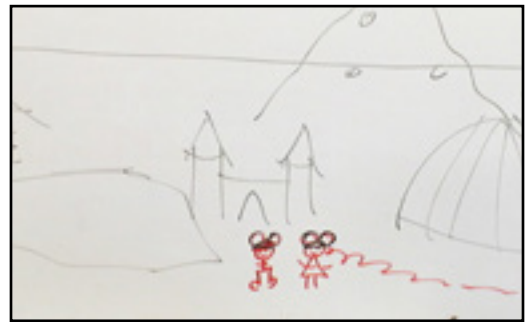
- Jill warns Jack that his plan could be a social disaster, but Jack doesn't know what else to do.
- He pulls out a box of matches, lights one, and all the ears (which represent hydrogen) and all the heads (which represent oxygen) explode.
- The explosion is so big it blasts Evil Mister Fred all the way to Neptune.
- Then the heads combine with the ears again, and the heads start falling from the sky.
- The heads don't land on their original bodies. A baby head lands on a grandpa body, a grandpa head lands on a baby body, men's heads land on women, boys' heads land on girls, etc.
- Everybody lives kind of medium ever after, except Evil Mister Fred.

**Transcript:** (No Introduction -- Lesson begins with the story)

## Story: "Evil Mister Fred Attacks Disneyland"

Once upon a time, Evil Mister Fred stole a whole bunch of tickets to Disneyland. He thought, "Wow! I could go to Disneyland a thousand times, or I could give them away and make so many people happy. Hmmm. I'll give them away and make so many people happy." And his minions said, "Evil Mister Fred! What's wrong with you? You can't do that." And he said, "Aw, but they might end up even sadder than before." The minions said, "Yeah, that's the way to go!"

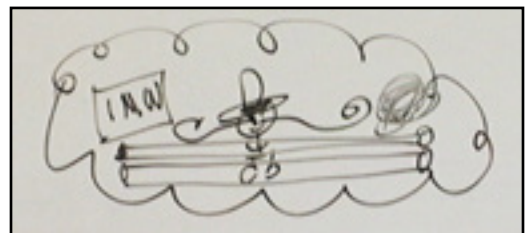
So Evil Mister Fred put a free ticket in a cardboard box and a pair of Mickey Mouse ears, sealed them up and sent them to all his friends -- or enemies, that being the case. And Jack and Jill happened to receive their own special boxes from Evil Mister Fred. And they opened them up and sure enough, there was a ticket to Disneyland there, and Mickey Mouse ears. They said, "Woo-hoo! We're going to Disneyland!" And Jill put on her ears, and Jack put on his ears, and they were dancing around. And the next day they were going to go to Disneyland. But they tried to take off their ears, and the hat and the ears were stuck to their heads. No matter how they tried, they couldn't get them off. And they went to bed sleeping with Mickey Mouse ears on.



Jack and Jill at Disneyland.

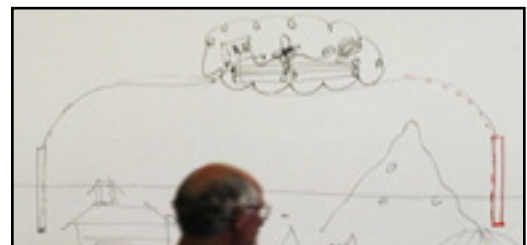
The next day they got up, and they said, "Oh, well, even though we can't get them off, we'll go to Disneyland." And Disneyland has a mountain with a roller coaster going through caves. It has a Space Mountain, I think there's a roller coaster in there. There's a haunted house, there's a jungle ride, and there's a castle there that people go in. And Jack and Jill showed up along with everybody else, and everybody else was just like them. They had Mickey Mouse ears on, and they couldn't get them off. But nobody cared.

And Evil Mister Fred was flying overhead in his Evil Mister Fred cloud. And Evil Mister Fred has in his cloud a couple of telephone poles, and he's got a bunch of wire, and a million-watt generator. And he says, "I think we're all set here." And then, when Disneyland opened up, everybody said, "Yayy!" And they ran in, off to their favorite rides. Jack and Jill were running over to Space Mountain. Everybody else was running in the directions they wanted to go. And Evil Mister Fred flew overhead, and he said, "Oh, look at those poor creatures. They have no idea what's about to happen to them."



Evil Mister Fred on his Cloud.

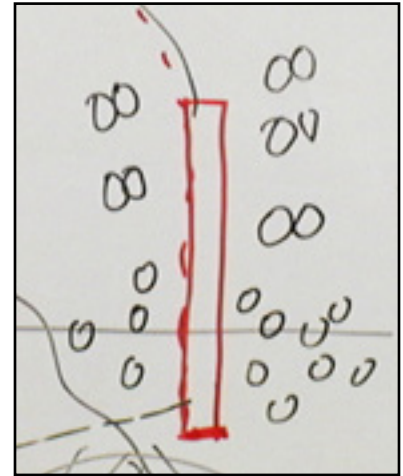
And he took one of the telephone poles and shoved it out of the cloud. And it came zooming down -- ka-poomm -- hit the ground and stuck it, like that. Then he took the other pole, and he shoved it out of the cloud -- zzh-h-boomm -- and it stuck



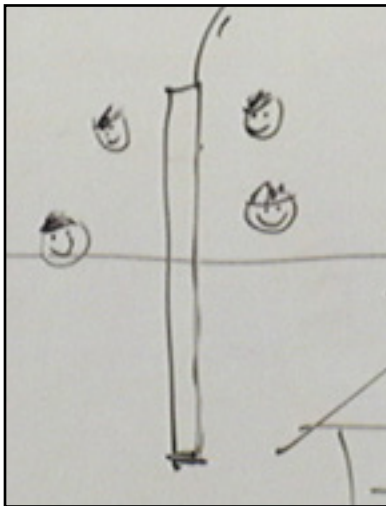
The two Poles hooked up to the Generator.

in the ground. And he had wires going from the poles up to his million-watt generator. And Evil Mister Fred said, "Now, to see what goes on." And he turned on the generator -- rrrrrnnn-rrnnn-rrrrnnnn-rrrrnnn-rrrrnnn-rrrrnnn.

As soon as he did, all the people started walking toward the red pole. And as they got closer and closer, they were going faster and faster and faster, until they were running at full speed. When they got there, they hit the pole at high speed with the top of their head -- whamm! They hit it so hard that their ears flew right off. So now there are Mickey Mouse ears floating in the air all over the place. And pretty soon, the Mickey Mouse ears joined together and became Mickey Mouse ear butterflies, and were flying all around. *[Student: They have to take off the hats now.]* They still had the hat part on their heads.



Ears Floating around the Pole.



Heads Floating around the Pole.

Then, as they were wandering around, dazed from hitting the pole with their head, they started to go toward the other pole. And the same thing happened. They went faster and faster and faster toward the other pole. And this time, they just hit it flat -- ka-boom! They hit it so hard that their entire head fell off -- kzhoom! And now there are heads floating in the air with the tops of Mickey Mouse hats.

Now, Jack and Jill were attracted to the first pole, but Jack got all tangled up in Jill hair, because it happens. And Jill's hair got tangled in a bush. And they were hanging straight out in mid-air. There's Jill, and here's Jack all tangled up in Jill's hair. And Jack said, "Oh, no! Did you see what happened? These



Jack &amp; Jill Tangled in Jill's Hair.

people are smashing their heads against that pole!" And then he saw the people going the other way and their heads falling off and their little bodies running around with no head. And there were all kinds of people there. There were old people, young people, men, women, boys and girls, little babies, with bodies running everywhere and their heads floating up in the air.

And Jack and Jill said, "We've got to stop this! This is horrible!" And Evil Mister Fred looked down from his cloud and he said, "Wa-ha-ha-ha!" Jack said, "I know a way to end the torture." If you were Jack, what would you do?

## Imagination and Brainstorming Time

*[Students make suggestions]* (THERE ARE NO WRONG ANSWERS! Whatever they say, you should reply: "That's a good idea," "They might do that," etc. After brainstorming, proceed with the experiments, then finish the story.)

We'll leave this To Be Continued . . .

## Experiment: *Exploding Bubbles*

What we have here is some water with some chemical in it, and when you turn on the electricity, it's making bubbles. You remember when you did the hand-crank generators, you made bubbles? This is the same sort of thing. It's making some bubbles there. The bubbles are coming out through this tube, out that end. Some of the bubbles are hydrogen. Some of them are oxygen. In our story, there were two poles. The ears falling off their Mickey House hats -- those represent hydrogen gas, because there are two ears for every water molecule. The heads represent the oxygen that's in water. This is taking off the ears, as a gas, and the heads, and mixing them together and they come out the tube. We want to do something with it.

So we need soap. Here's ordinary soap, and if I dip the tube in the soap solution, it makes little bubbles. Now, there's also in the jar some ordinary air, just like you breathe. And there's a little bit of hydrogen now, and a little bit of oxygen. And then we're going to put a flame on it. *[Assistant ignites the bubbles.]* There -- did you hear that? That was the hydrogen and oxygen. Was that so loud that your head said, "Oh, no, that was too loud?" *[Students: No.]* Well, what if I took some of this soapy stuff and I put it in my hand? And I'm getting a pile of bubbles in my hand, and we're going to light them on fire. And watch my hand and see if it disappears. *[Assistant ignites the bubbles.]* Aww, it didn't disappear! Now, we have our lovely assistant here who is volunteering to let us do an explosion in her very own hand. *[Instructor repeats experiment in assistant's hand.]*



Apparatus that separates Hydrogen and Oxygen from Water



Make Soap Bubbles in the Plastic Cup, then ignite them.



Igniting Bubbles in Hand



If you would like to have a puffy bubble in your hand, make a line here. *[Students line up one at a time. Instructor puts soap solution in student's hand and uses tube to make bubbles. Then the assistant ignites the bubbles with a butane lighter. Students have the option of wearing earmuffs when it's their turn.]*

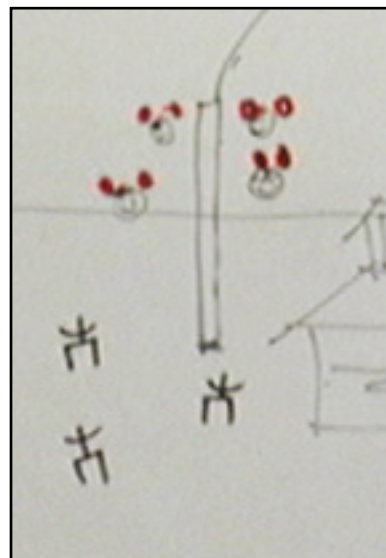


Instructor ignites Bubbles in student's Hand.

## End of Story

***\* DO NOT \* present this part of the lesson until after the experiments!***

So Jack has an idea, and Jill says, "No, Jack! Don't do it! No one knows what could happen. It could be a social disaster." And Jack says, "But we've got to do something. We must act now!" So he pulled out of his pocket a box of matches. And he struck the match -- pshhheewww! As soon as he did, all of the ears, which represent hydrogen, and all of the heads, which represent oxygen, went ka-boommmm! It was an explosion worthy of anything ever seen on earth. And it blew Evil Mister Fred clear up to Neptune. And the heads combined with the ears. Now all the heads have ears again. And the heads started to fall from the sky -- aaaaaahhhhhhhh! aaaahhhh! aaahhh! And the little bodies were running all around. And a grandpa's head fell on a baby's body -- ka-zumph! And he said, "Whoa, I like this." And a little baby's head fell on the grandpa's body -- ka-zumph! He said, "Ohhh, no!" Boys heads fell on girls, men's heads fell on women, there was all kinds of weirdness going on. And everybody lived kind of medium ever after that, except Evil Mister Fred.



Ears rejoin Heads and fall onto random bodies.

## End of Lesson

***If you have questions about this lesson, please ask them through the [online Teacher Support Forum](#) on our web site.***