

## Lemons and Limes! More Exploration with Density

**Objective:** Students will be able to describe basic properties of density by participating in an investigation.

Standards: K-PS2-1 SP3 SP4 SP6

Subject(s): Science

 60 minutes

### Opening - 5 minutes

This lesson is structured to allow students to use knowledge from our previous lesson about oranges and their density. I want students to apply what they learned to make logical predictions about what will happen when an orange or a lime is dropped into water. Will it float? Will it sink? Most importantly, I want them to be able to verbalize WHY they made the prediction they made and I incorporate lots of time into the lesson for the students to talk about this to build their thinking skills and expand their vocabulary.

To begin the lesson, I ask the students to summarize for me what happened during our investigation with oranges. I ask the students:

*What happened when we dropped the orange in the water with the peel on?*

*How about when we took the peel off?*

*Why did the orange sink without the peel, even though it was lighter than when the peel was on it?*

*Yesterday, I asked you to make a prediction about what would happen if we dropped a lemon into the water.*

*Today, we are going to find out what happens!*

### Investigation and Discussion-Part 1 - 15 minutes

#### Supplies Needed:

- **Large container of water**

*Materials Tip: I use clear, plastic animal cracker and pretzel containers (see photo). They hold a lot of water, the sides are clear so the students can easily see what's happening and I put the cap back on the container and save the water for the next day, so I am not wasting so much water (Click [here](#)*

*(<https://betterlesson.com/lesson/resource/3212261/container>) to see a picture of the container)*

- **One lemon**

*Materials Tip: check to make sure it floats, they usually do, but there is always that possibility*

- **One lime**

*Materials Tips: check to make sure it sinks, again they usually do, but check to make sure*

• [Lemon Lime Recording Sheet](https://betterlesson.com/lesson/resource/3212260/lemon-lime-recording-sheet-pdf) (<https://betterlesson.com/lesson/resource/3212260/lemon-lime-recording-sheet-pdf>) included as a PDF in this lesson

I pass out the recording sheets to the students and I have them put their names on the top. I tell the students, *We are going to be testing lemons to see whether they sink or float. I want you to pass the lemon around the table and I want each of you to make a prediction as to whether you think the lemon will float or sink. Make sure to tell WHY you think that way and then record your result on the sheet.*

The students pass the lemons around the table and make their predictions (see [video](https://betterlesson.com/lesson/resource/3211855/lemon-with-peel-prediction-mp4) (<https://betterlesson.com/lesson/resource/3211855/lemon-with-peel-prediction-mp4>)). After everyone has made their predictions, a student from each group hold the lemon over the container of water. We count off and the lemon is dropped into the container (see [video](https://betterlesson.com/lesson/resource/3212259/lemon-drop-mp4) (<https://betterlesson.com/lesson/resource/3212259/lemon-drop-mp4>)). It floats. The students are not surprised by the results. It is what they anticipated would happen.

The students now peel the lemon. After the lemon is peeled, it is passed around and a prediction is made and recorded. Again we count off and the lemon is dropped into the water. This time it sinks and again, the students' predictions were fairly accurate. They took what they knew from the orange investigation in the previous lesson and applied it to the lemon. We also drop pieces of the lemon peel in the water to see if it floats like the orange did.

I discuss this part of the experiment with the students. I want them to make the connection that their use of prior knowledge from the previous investigation helped them to make a good prediction. Here are some questions I asked:

*How did you do with your predictions? Why do you think your predictions were so accurate? Did you use what you know about the oranges to help you make this prediction? Why did that help you? So, you used what you learned from one situation and applied it to a similar situation to make a good prediction. It sure sounds like you are thinking like scientists. Now let's see if you can use this information to make another prediction.*

## RESOURCES



Lemon with Peel Prediction.mp4 <https://betterlesson.com/lesson/resource/3211855/lemon-with-peel-prediction-mp4>



Lemon Drop.mp4 <https://betterlesson.com/lesson/resource/3212259/lemon-drop-mp4>



Lemon Lime Recording Sheet.pdf <https://betterlesson.com/lesson/resource/3212260/lemon-lime-recording-sheet-pdf>



20150306\_141919.jpg <https://betterlesson.com/lesson/resource/3212261/container>

## Investigation and Discussion-Part 2 - 20 minutes

We now switch our focus to the limes. I have the students pass the lime around and make a prediction as to whether the fruit will sink or float, making sure to tell why. I noticed that the students sometimes had problems supporting their ideas so I asked questions to model what they might be drawing upon when making their predictions (see [video](https://betterlesson.com/lesson/resource/3212273/lime-prediction-mp4) (<https://betterlesson.com/lesson/resource/3212273/lime-prediction-mp4>)).

After the students make their prediction, we hold the lime over the container of water and we count down and drop it in. There is quite a reaction in the room (see [video](https://betterlesson.com/lesson/resource/3212274/lime-drop-mp4) (<https://betterlesson.com/lesson/resource/3212274/lime-drop-mp4>)). The majority of the class thought the lime would float.

Now we peel the lime and the students make another prediction and record it on their sheet. We again count off and drop the lime into the water. The lime sinks. Some of the students changed their predictions because they thought it would be the opposite of the lemon with and without the peel...interesting thinking. I had them throw some pieces of the lime peel in the water

I then ask the students some questions to wrap up our learning:

*Were you surprised that the lime did not float with the peel on? Why were you surprised? Why didn't the lime float? What did you notice about the peel? When you threw the peel in the water, did it float as high as the lemon? Why do you think that is? What are some differences you notice in the lime peel compared to the lemon peel when feeling it? Which one is more dense, the lemon or lime peel? Sometimes scientists make a prediction that ends up being wrong. The scientists then need to think about why their prediction was not right. They need to gather more information and adjust their thinking. Hopefully, this helps them make a better prediction the next time around.*

## RESOURCES

 Lime Prediction.mp4 <https://betterlesson.com/lesson/resource/3212273/lime-prediction-mp4>

 Lime Drop.mp4 <https://betterlesson.com/lesson/resource/3212274/lime-drop-mp4>



### APPLIED KNOWLEDGE: Connection to Prior Knowledge

In this lesson, the students needed to take what they learned about the density of oranges and apply it to the density of lemons and limes. Their learning in the previous investigation was foundation for the predictions made in this investigation.

The students did a great job applying what learned from the orange investigation to the lemon. There predictions and reasoning were extremely accurate. It was fun to see a curve ball thrown at them with the lime. What happened was a case of over generalization. Since it worked this way twice, it will continue to work this way. This event was a good reminder how we can apply prior knowledge, but we must also examine the evidence in front of us closely. It was the two students who really looked at the lime critically that made accurate predictions. They noted it was heavier and that the skin seemed different.

I think a great extension on this lesson would be to take their learning even further. Could they accurately make predictions now with a grapefruit and a kiwi? Would they look critically at each one and apply what they know? It would be fun to find out...I think we just might try it!