The Reef
<u>Theme:</u> Seeing is Believing!
April-May 2012
Power Lab

John 20:24-31

24 Thomas was one of the Twelve. He was called Didymus. He was not with the other
disciples when Jesus came. 25 So they told him, "We have seen the Lord!"

But he said to them, "First I must see the nail marks in his hands. I must put my finger where the nails were. I must put my hand into his side. Only then will I believe what you say."

26 A week later, Jesus' disciples were in the house again. Thomas was with them. Even though the doors were locked, Jesus came in and stood among them.

He said, "May peace be with you!" 27 Then he said to Thomas, "Put your finger here.
See my hands. Reach out your hand and put it into my side. Stop doubting and believe."

28 Thomas said to him, "My Lord and my God!"

29 Then Jesus told him, "Because you have seen me, you have believed. Blessed are those who have not seen me but still have believed."

30 Jesus did many other miraculous signs in front of his disciples. They are not written
down in this book. 31 But these are written down so that you may believe that Jesus is the
Christ, the Son of God. If you believe this, you will have life because you belong to him.

Opening:

<u>Ask:</u>

- What do we celebrate on Easter?
- How do we <u>know</u> that Jesus was alive and that someone didn't just steal his body from the tomb? (eyewitness accounts)

<u>Say:</u>

Jesus made many appearances to people for 40 days after he was resurrected. Today we will be talking about one of those appearances.

Our Bible story is about the disciples on Easter day. They were told something even more incredible that seemed hard to believe--that Jesus had risen from the dead! But one of the disciples had a difficult time believing this story. Let's read and find out about that person.

Scripture:

- Have everyone open their Bibles to the New Testament (Divide Bible in ½ then in the back half, divide in half again.)

Grades K-2 – find John and the teacher reads the passage out loud
Grades 3-5 – find John 20:24-31 and have a student read the passage out loud

Ask:

- ✞ What was Thomas' reaction to learning Jesus had risen?

Say:
Thomas did not believe the story that Jesus had risen. He had a doubt, or a moment of unbelief. He has been called "doubting Thomas" because he wanted proof before he would believe that Jesus was alive again.

Ask:

- ✞ Was Jesus mad at Thomas for not believing at first?
- ✞ Does Jesus want us to believe in him without a doubt?
- ✞ Is it ok if you have questions about your faith in God or Jesus?
- ✞ Do you find it easy to believe what someone tells you, even if what he or she tells you seems impossible?

Activity #1 Science Experiments

Say:
The purpose of what we're about to do is to demonstrate that, like Thomas, we all need information and experience in order draw accurate conclusions.

The only evidence Thomas had was the other disciples' word that Jesus was alive. I wonder why he didn't believe his good friends when they told him Jesus was alive? Their word wasn't enough for him. He needed to see for himself. All his past experience and knowledge told him that Jesus was dead.

So-let's begin.

Start off each experiment something like this:

Say:
I'll bet that I can _________________ .

- ✞ How many of you think I can do that?
- ✞ How many of you think I can't?
- ✞ Why?

If the student say's he/she has done the experiment before, emphasize that their knowledge and experience leads them to believe that you can _________. Seeing is believing.

If students say that they believe you because they trust you, tell them that believing without seeing is called faith.

Closing:
Jesus wants us to believe in him without a doubt, and looks for our faith. But he understands and has compassion for us when we do doubt—like he did for Thomas. While the world may tell us, like in these experiments, that seeing is believing, the Bible teaches us to believe first . . . then we will see.

Closing Prayer:
Thanks you, God, for teaching us about Thomas. Forgive us when we doubt in you. Help me to live in a way that shows everyone our faith in you. Amen.

1. Eating Nails for Breakfast
Is there iron in that big bowl of cereal?

The next time you're eating a big bowl of breakfast cereal, take a closer look at the ingredients. You'll find that your cereal contains more than just wheat and corn. Look closely and you might find iron... you know, the metal... the stuff used to make nails. Here's an experiment to see if there really is metallic iron in your breakfast cereal.

Materials

- Box of iron-fortified breakfast cereal (Total® works well)
- Measuring cup
- Super strong magnet
- Quart-size zipper-lock bag
- Water
- Dinner plate





1. Open the box of cereal and pour a small pile of flakes on the plate. Crush them into tiny pieces with your fingers. Spread out the pile so it forms a single layer of crumbs on the plate. Bring the magnet close to the layer of crumbs (but don't touch any) and see if you can get any of the pieces to move. Take your time. If you get a piece to move without touching it, that piece may contain some metallic iron.
2. Firmly press the magnet directly onto the crumbs but don't move it. Lift it up and look underneath to see if anything is clinging to the magnet. Several little pieces may be stuck there. Is it the magnet being attracted to static electricity or just sticky cereal? It could be the iron. Throw away the small pile of cereal and clean off the magnet.

3. Pour water into the plate and float a few flakes on the surface. Hold the magnet close to (but not touching) a flake, and see if the flake moves toward the magnet. (The movement may be very slight, so be patient.) With practice, you can pull the flakes across the water, spin them, and even link them together in a chain. Hmmm... there must be something that's responding to the magnet. Could it be metallic iron? In your cereal?
4. It's time to mix up a batch of cereal soup to further investigate the claim of iron in your breakfast cereal. Measure 1 cup of cereal (that's equal to one serving according to the information on the side of the cereal box) into a quart-size zipper-lock bag. Fill the bag one-half full with warm water. Carefully seal the bag, leaving an air pocket inside.
5. Mix the cereal and the water by squeezing and smooshing the bag until the contents become a brown, soupy mixture. Allow the mixture to sit for at least 20 minutes.
6. Make sure the bag is tightly sealed and position it on a flat side in the palm of your hand. Place the super-strong magnet on top of the bag. Put your other hand on top of the magnet and flip the whole thing over so the magnet is underneath the bag. Slowly slosh the contents of the bag in a circular motion for 15 or 20 seconds. The idea is to attract any free moving bits of metallic iron in the cereal to the magnet.
7. Use both hands again and flip the bag and magnet over so the magnet is on top. Gently squeeze the bag to lift the magnet a little above the cereal soup. Don't move the magnet just yet. Look closely at the edges of the magnet where it's touching the bag. You should be able to see tiny black specks on the inside of the bag around the edges of the magnet. That's the iron!
8. Keep one end of the magnet touching the bag and move it in little circles. As you do, the iron will gather into a bigger clump and be much easier to see. Few people have ever noticed iron in their food, so you can really impress your friends with this one. When you're finished, simply pour the soup down the drain and rinse the bag.

How does it work?

Many breakfast cereals are fortified with food-grade iron particles (metallic iron) as a mineral supplement. Total® cereal is the only major brand of cereal that claims to contain 100% of your recommended daily allowance of iron. The chemical symbol for iron is Fe. Metallic iron is digested in the stomach and eventually absorbed in the small intestine. If all of the iron from your body was extracted, you'd have enough iron to make only two small nails.

Iron is found in a very important component of your blood called *hemoglobin*. Hemoglobin is the compound in red blood cells that carries oxygen from your lungs so that it can be utilized by your body. It's the iron in hemoglobin that gives blood its red appearance.

A diet deficient in iron can result in fatigue, reduced resistance to diseases, and increased heart and respiratory rates. Food scientists say that a healthy adult requires about 18 mg of iron each day. So, as you can see, iron is a very important part of what you and your friends and family need to stay healthy. Eat up! Cereal for dinner!

2. Squeeze an egg as hard as you can without breaking it.

Warning: Always wash your hands well with soap and water after handling raw eggs. Some raw eggs contain salmonella bacteria that can make you really sick!

Squeeze an Egg Without Breaking It

Eggs are amazingly strong despite their reputation for being so fragile. Place an egg in the palm of your hand. Close your hand so that your fingers are completely wrapped around the egg. Squeeze the egg by applying even pressure all around the shell. To everyone's amazement (mostly your own) the egg will not break. If you're a little nervous about the outcome, try sealing the raw egg in a zipper-lock bag before putting the squeeze on it, or hold the egg over the sink if you're in the super-brave category.

Now hold the egg between your thumb and forefinger and squeeze the top and bottom of the egg. Are you covered in egg yolk? Why not?

Finally, hold the egg in the palm of your hand. Press only on one side of the shell. Do not squeeze the egg - just press on the side. Uh oh. Why do you think that happened?

How does it work?

The egg's unique shape gives it tremendous strength, despite its fragility. Eggs are similar in shape to a 3-dimensional arch, one of the strongest architectural forms. The egg is strongest at the top and the bottom (or at the highest point of the arch). That's why the egg doesn't break when you add pressure to both ends. The curved form of the shell also distributes pressure evenly all over the shell rather than concentrating it at any one point. By completely surrounding the egg with your hand, the pressure you apply by squeezing is distributed evenly all over the egg. However, eggs do not stand up well to uneven forces which is why they crack easily on the side of a bowl (or why it cracked when you just pushed on one side). Be careful not to wear a ring while performing our squeezing act. The uneven pressure of the ring against the shell will result in an amusing display of flying egg yolk for your audience members. This also explains how a hen can sit on an egg and not break it, but a tiny little chick can break through the eggshell - the weight of the hen is evenly distributed over the egg, while the pecking of the chick is an uneven force directed at just one spot on the egg.

3. Walking on Eggs

Can you walk across eggs without cracking them?

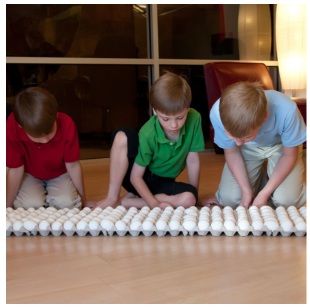
Materials

- A few dozen eggs that are in egg cartons (Select large-sized eggs)
- Large plastic trash bag
- Bucket of soap and water (and some disinfectant)
- Barefoot friends

Note: There's a very high probability that you'll break a few eggs while attempting to learn this amazing trick. Since raw eggs carry the danger of Salmonella, it's important that you clean up, wash your hands, and disinfect the area. Even if you don't break an egg, it's still a good idea to wash your hands (and feet!) after handling eggs.





1. If you just want to attempt the feat of standing on eggs, you'll only need two cartons of eggs (two dozen eggs). If, however, you're feeling up to the Walking on Eggs challenge, pick up six or eight cartons of large-sized eggs.
2. Spread the plastic trash bag (or bags) out on the floor and arrange the egg cartons into two rows.
3. Inspect all of the eggs to make sure there are no breaks or fractures in any of the eggshells. Make any replacements that might be necessary.
4. It's important to make sure all of the eggs are oriented the same way in the cartons too. One end of the egg is more "pointy" while the other end is more round. Just make sure that all of the eggs are oriented in the same direction. By doing this, your foot will have a more level surface on which to stand.
5. Remove your shoes and socks . . . and pick the lint out from between your toes. (This has no bearing on the success of the challenge, but let's face it, toe fuzz is kind of gross.)
6. Find a friend to assist you as you step up onto the first carton of eggs. The key is to make your foot as flat as possible in order to distribute your weight evenly across the tops of the eggs. If the ball of your foot is large, you might try positioning it between two rows of eggs instead of resting it on the top of an egg.
7. When your foot is properly positioned, slowly shift all of your weight onto the egg-leg as you position your other foot on top of the second carton of eggs.
8. There will be creaking sounds coming from the egg carton, but don't get nervous. Ask your friend to step away and allow your fans to click pictures. Just think . . . for all the right reasons, you'll be an Internet sensation in just minutes.
9. If you have more than two cartons of eggs, what are you waiting for? Keep walking! The cheers and wild screams from your fans grow louder with each step you take until finally you land on firm ground and marvel at your success.

Okay, there's a second scenario that we should mention: you forget to make your foot as flat as possible, your friend doesn't provide any support, and your foot crushes through eight of the twelve eggs. As the goo erupts from between your toes, you think to yourself, "Maybe the other carton will be better." Quickly you discover that both feet are covered in eggy goo and the experiment is a complete failure. Don't worry, your fans are still taking pictures and you're still going to be an Internet sensation, but for a completely different reason. Ah, show business!

How does it work?

Plain and simple, the shape of the egg is the secret! The egg's unique shape gives it tremendous strength, despite its seeming fragility. Eggs are similar in shape to a three-dimensional arch, one of the strongest architectural forms. The egg is the strongest at the top and the bottom (or at the highest point of the arch). If you hold an egg in your hand and squeeze it on the top and the bottom, the egg doesn't break because you are adding pressure to the ends which are the strongest parts of the egg. The curved form of the shell also distributes pressure evenly all over the shell rather than concentrating it at any one point. If you completely surround the egg with your hand and then squeeze, the pressure you apply by squeezing is distributed evenly all over the egg. However, eggs do not stand up well to uneven forces, which is why they crack easily on the side of a bowl (or why it would crack if you just pushed on one side). This also explains how a hen can sit on an egg and not break it, but a tiny little chick can break through the eggshell. The weight of the hen is evenly distributed over the egg, while the pecking of the chick is an uneven force directed at just one spot on the egg.

If you guessed that the egg carton probably played a role in keeping the eggs from breaking, you're right. Joseph Coyle is credited as the inventor of the first container made specifically to keep eggs from breaking as they were transported from the local farm to the store. As the story goes, Coyle invented the egg carton in 1911 as a way to solve a dispute between a farmer and a hotel operator who blamed the farmer for delivering broken eggs. Coyle designed a container made out of thick paper with individual divots that supported each egg from the bottom while keeping the eggs separated from one another. As legend has it, the fully loaded egg carton can even be dropped, and if it lands just right, the eggs will survive the fall.

4. Straw Through Potato

Materials

- 2 or more stiff plastic straws
- Raw potato
- Paper towels

1. The challenge is quite simple: Stab the straw through the potato without bending or breaking the straw. Most of your guests will think it can't be done but you, of course, know better.
2. As you hold the potato, keep your fingers on the front and thumb on the back and not on the top and bottom. You don't want to stab yourself! Grab the straw with your writing hand and (shh! this is the secret) cap the top end with your thumb.
3. Hold on firmly to both the straw and the potato and with a quick, sharp stab, drive the straw into and partway out of the narrow end of the spud (not the fatter middle part). You're so cool!
4. Your audience will be impressed and want to try it. Tell them to hold the spud the way you did so they don't stab a finger or thumb with the straw. They may not know the secret, but don't give it away just yet. Let them try to figure it out. You may need more stiff straws.

You know exactly where to go next. Open the refrigerator and search for your favorite fruits and vegetables that seem best suited for a straw attack.

How does it work?

The secret is inside the straw - it's air! Placing your thumb over the end of the straw traps the air inside. When you trap the air inside the straw, the air molecules compress and give the straw strength, which in turn keeps the sides from bending as you jam the straw through the potato. The trapped, compressed air makes the straw strong enough to cut through the skin, pass through the potato, and exit out the other side. Without your thumb covering the hole, the air is simply pushed out of the straw and the straw crumples and breaks as it hits the hard potato surface.

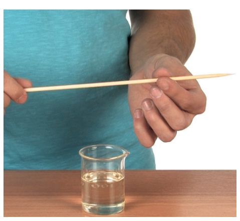
Be sure to keep your fingers out of the way. After you stab with the straw, take a look at the end that passed through the potato. There's a plug-o'-spud inside the straw. If you should have a finger or thumb or hand in the way of the straw as it collides with the potato, then there will be a plug-o'-you in the straw, too. Ouch!

5. Balloon Skewer

Learn how to pierce a balloon without popping it, thanks to polymers!

Materials

- Several latex balloons (9-inch size works well)
- Bamboo cooking skewers (approximately 10 inches long)
- Cooking oil
- Sharpie pen
- Nerves of steel




The first step is to inflate the balloon until it's nearly full size and then let about a third of the air out. Tie a knot in the end of the balloon.

1. If you carefully examine the balloon you'll notice a thick area of rubber at both ends of the balloon (where you tied the knot and the opposite end). This is where you will pierce the balloon with the skewer … but not yet. Keep reading.
2. Dip the tip of the wooden skewer into the cooking oil, which works as a lubricant.
3. Place the sharpened tip of the skewer on the thick end of the balloon and push the skewer into the balloon. Be careful not to jab yourself or the balloon with the skewer. Just use gentle pressure (and maybe a little twisting motion) to puncture the balloon.
4. Push the skewer all the way through the balloon until the tip of the skewer touches the opposite end of the balloon where you'll find the other thick portion of the balloon. Keep pushing until the skewer penetrates the rubber. Breathe a huge sigh of relief and take a bow! Ta-Da!
5. Gently remove the skewer from the balloon. Of course, the air will leak out of the balloon, but the balloon won't pop.

Let's do it again, but this time you'll see the hidden "stress" in a balloon.

1. Before blowing up the balloon, use the Sharpie pen to draw about 10-15 dots on the balloon. The dots should be about the size of the head of a match. Be sure to draw them at both ends and in the middle of the balloon.
2. Inflate the balloon half way and tie the end. Observe the various sizes of the dots all over the balloon.
3. Judging from the size of the dots, where on the balloon are the latex molecules stretched out the most? Where are they stretched out the least?
4. Dip the tip of the wooden skewer in the vegetable oil and use your fingers to coat the skewer with oil.
5. Use the observations that you made previously about the dots on the balloon to decide the best spot to puncture the balloon with the skewer. Of course, the object is not to pop the balloon!

How does it work?

The secret is to uncover the portion of the balloon where the latex molecules are under the least amount of stress or strain. After drawing on the balloon with the Sharpie marker, you probably noticed that the dots on either end of the balloon were relatively small. You've just uncovered the area of least stress... the ends of the balloon. When the point of the skewer is positioned at the ends of the balloon, the solid object passes through the inflated balloon without popping it.

If you could see the rubber that makes up a balloon on a microscopic level, you would see many long strands or chains of molecules. These long strands of molecules are called *polymers*, and the elasticity of these polymer chains causes rubber to stretch. Blowing up the balloon stretches these strands of polymer chains. Even before drawing the dots on the balloon, you probably noticed that the middle of the balloon stretches more than either end. You wisely chose to pierce the balloon at a point where the polymer molecules were stretched out the least. The long strands of molecules stretched around the skewer and kept the air inside the balloon from rushing out. It's easy to accidentally tear the rubber if you use a dull skewer or forget to coat the end of the skewer with vegetable oil. When you remove the skewer, you feel the air leaking out through the holes where the polymer strands were pushed apart. Eventually the balloon deflates… but it never pops.

Oh, just to prove your point, try pushing the skewer through the middle part of an inflated balloon. Well, at least you went out with a bang!