This is a transcript of the video “Absorption ~ STEAM Education from Queensland”
While you are watching the video, you can use this transcript for your better understanding of the contents.

Introduction by Kevin (the navigator)

00:08

Hello, everyone! I’m Kevin and I’m the navigator for today’s session. I usually work at TGG.
Today’s theme is about “Absorption.”
What is absorption?
There are many substances around us. Some substances absorb liquid and other substances do not. Have you ever thought about which substances absorb liquid and how they change when they absorb liquid?
In today’s session, we’re going to find answers to these questions by doing experiments.
Let’s take a look at how the students proceed with the experiments and what conclusions they draw from the results of these experiments.

Before starting the session, I will introduce some words used in this session to help you warm up.

density, you try
density
The star is believed to have high density.

expand, you try
expand
Rice cakes expand as they are heated.

absorbent, you try
absorbent
This cloth is highly absorbent.

OK. Now you’re ready!
Let’s experience the seminar class in Queensland together!

Join the classroom in Queensland

02:21

Hi, my name is Miss Tourish, and I am the head of curriculum for STEM at Bellevue Park State School.

Welcome to the Queensland classroom.

Today we are going to be learning about absorbency.

In today's lesson, we are going to ask lots of questions.

We are going to be working as a team, because teamwork is really important in the Queensland classroom.

Our learning goal today, what we want to do is talk about science.

Can anyone tell me what is science?

Or what are the strands of science?

Yes.

Like biology and physics.

Yeah, what is biology?

Biology is like studying the natural world and our bodies and what's around us.

Fantastic, what about physics?

Who can explain what physics is?

Yes.

Physics is the movement of objects.

Yes.

And things like gravity and how they affect.

That's right, understanding the mathematics of the world of that type of science as well.

Absolutely.

Can you think of the other strands of science?

Chemistry.

Chemistry, that's right.

What is chemistry?

Studying chemicals and how they react to each other.

That's right, and that's what we're going to be doing today.

We're going to be doing a little bit of a chemistry experiment today.

And our experiment is going to be about absorbency.

So today we will do an experiment about absorbency.

And we're going to discuss our observations together.

And remembering that teamwork is a really important part of our lesson today.

Are you ready?

Yes.

Okay, now there's some words that we're going to be talking about today that I'll introduce at the beginning.

And I'd love you to use those words when you're describing what we see today.

So, first of all, there is heavy.

What does the word heavy mean?

Yes.

The density of an object.

Fantastic.

So, if something has more density or more mass, it will be heavier.

If something has less mass or less density it will be lighter.

So, today you might use the term heavy.

Another word we'll use today is expand.

Can you tell me what expand means?

It means to get bigger or to grow.

Fantastic.

Now, with our hands can you show me what expand looks like?

Fantastic.

Now these ones are really important for us today because as scientists we do these every day.

The first one is to observe.

To observe something is to use our eyes, our ears, our hands, our smell to observe what is going to be happening in our scientific investigation.

And to predict.

This is a really, really important one.

Can anyone tell me what does the word predict mean?

Especially when we're talking about science.

Who haven't I asked yet?

Yes.

Make an assumption or guess what might happen.

Absolutely, to make like an educated guess.

So we use the information around us to help us make an educated guess or assumption.

I love that word, assumption.

So, to absorb, this is a really important word today.

So when we absorb something, it means that something is going to change.

I'm not going to explain it yet because we'll talk about at the end.

And the other one will be dissolve.

If something dissolves, okay, there's another kind of chemical reaction.

As we go through the lesson, maybe you'll be able to help me explain those.

Now, the materials that we're going to be using today is, we'll have some paper towel and some sponge.

You can see that on your desk you have some sponge already there.

And our first little experiment that we do today is going to be about that sponge, and whether it is going to absorb.

Is it going to dissolve?

Is it going to expand?

Is it going to get lighter or heavier?

And I want you to make some predictions first.

So whenever we do a science experiment or an investigation, we have to remember to follow the scientific method.

Could someone please read this out for me?

Yes.

Step one, question.

Step two, predict.

Step three, experiment.

Step four, observe.

Fantastic.

So today, we're going to make sure that we follow this procedure with our scientific investigation today.

Now let's talk about what a prediction is first.

So, a prediction is a statement that someone makes about what they think is going to happen.

A great example of how we use science to help us make predictions is the weather.

No one really knows what the weather is going to be.

Lots of times you've seen the radar and it says it's going to rain but it might not happen.

But we use all the data that we can get to make a prediction or a good guess.

So if I had a look up at the sky and I saw that it had lots of dark clouds and the air was getting a little bit humid, I could make a prediction that the weather might...

Can anyone make a prediction?

Stormy.

Might be a storm coming.

Fantastic.

So today, we're going to be making lots of predictions before we do it.

So that then we can look at our data and see if we were correct in that.

And that's what a scientist does all the time.

They're always making predictions, experimenting and most of the time failing, to then be able to find out how to do things later on.

So, let's make a really easy prediction today about a sponge.

What will happen?

On your desks, you have some water.

And you have a plate with a piece of sponge on there.

What do we use a sponge for?

Yes.

Could be to mop things up or clean stuff.

Mop things up and clean things, great prediction.

Okay, what will happen when we pour the water on here?

The sponge will absorb the water so it doesn't go all over the plate.

Fantastic.

You've used that word that we had in there before that was absorb.

I wonder if you could have a small chat with your group to talk about what the definition of absorb means.

Off you go.

What does “absorb” mean?

08:20

Here, the teacher asked the students the definition of absorption.
What does “absorb” mean?

What was your opinion?
Let’s go back to the class and listen to the students’ opinions.

Take a liquid substance.

Collect.

What do you think it might mean to absorb?

To gather a liquid substance into one area.

Alrighty, everyone, eyes back up at the front for me.

I loved hearing all the conversation that you had about what you thought that word was.

And also the predictions that you made about what we’re going to do.

So, I’d love to ask a few students to tell me what they think absorb means.
.
Down the back here, I think you had a good explanation.

Would you like to talk?

Sure.

Absorption is the increase in mass.

Increase of mass, you think?

Okay.

Through what though?

If I sit on this chair, I might increase the mass but I’m not going to absorb into it.

In the intake of some sort of object.

The intake of some kind of object.

Specifically, what kind of matter do you think?

Usually a fluid.

Usually a fluid or a liquid, fantastic.

And there was a really good one down here as well.

To intake a liquid substance.

To intake a liquid or a substance.

So, what are we going to do now?

We’re going to see if our predictions are correct.

So, we think that the sponge is going to absorb, correct?

Yes.

All right.

Can you have a game of paper, scissors, rock with the person, people at your table?

And whoever is the winner will be the person that gets to pour the water on.

We won’t do the pouring just yet but have a quick game of paper, scissors, rock to decide.

Fantastic.

Do we have our leader at each table who will be doing the first experiment?

Yes.

All right, on the count of three we are going to pour the water into the sponge.

And then you are welcome to observe it and you can touch it as well.

You can feel it.

Just don’t take it off the plate.

And see if your prediction was correct.

Now it’s up to your group if you want to pour it all in one go or you’d like to do it in little bits and see how that affects your experiment.

One, two, three, over to you.

Make sure to have a discussion with your group members about what you think is happening and what your observations are.

The first experiment

11:16

Here, the teacher had the students do the first experiment. Let's predict the results and look at the experiment. And then, listen to the students' comments about the observations.

It's expanding.

Yeah, it's expanding.

It's getting sucked into it.

You can touch it.

You can pick it up.

You can squeeze it.

Oh, I love that word inundated.

Fantastic.

It's reached its max expansion point.

Every one of those sentences I love.

That's crazy, it's not expanding.

All righty, what happened?

Now you've had a chance to have a look at it, touch it, maybe squeeze it.

What happened to our sponge?

Was it absorbent like we predicted?

Yes.

Yes?

Very absorbent.

Okay, and what are some of the properties that we noticed about the sponge after we poured the water on there?

Um, it expands and gets heavier.

It expanded and got heavier.

Those two important words that we talked about at the start as well.

Fantastic.

Any other observations?

Yes

It didn't absorb all the water.

It didn't absorb all the water.

Why might you think that?

Because it has a certain limitation of how much it can hold.

I love that, there's a limit to how much that sponge can absorb.

How could you fix that?

If I said to you, I need to absorb all of that water, what could you suggest for me to do that?

Uh, having a bigger sponge.

Yeah, so, getting a bigger mass for it to be able to absorb.

Fantastic, and what about this back table?

It took in some of the water.

Also, small parts of the sponge actually came off the sponge.

And it's in the water.

Oh, okay, so some of it even dissolved off the side maybe.

Maybe because we cut it up that way.

Fantastic.

Yes.

The sponge's color got darker by how much water it took in.

It did, yeah.

Often times when you put water onto things it can change the color of it.

And that has something to do with the water reflecting on there and changing it inside that.

Fantastic.

Great observations, everyone.

So, we found out that it is absorbent.

It expands and it gets heavier.

So you've shown me that you're all very good predictors.

So now that you've shown me you can do a very easy experiment, let's do another experiment that's going to test whether materials are absorbent or not absorbent.

I'm going to give you a set of materials.

I'm going to give you some water, some plastic containers, some plastic powder which it's called sodium polyacrylate.

Can you say that for me?

Sodium polyacrylate.

That's right.

And we'll talk about at the end of the lesson how that might be used in the real world.

You're going to have a report sheet that we're going to write down our predictions and our answers on.

And then you've got some materials inside there.

So I'm just going to stop now.

And I'm going to prepare our next experiment.

So as you can see in front of you, you have the different materials that we spoke about.

And they are all in different containers.

So we have the sodium polyacrylate which is the white powder.

We have a Styrofoam ball.

We have a tablet.

We have some pebbles.

And we have a tissue.

Before we do the experiment, let's think back to the scientific method.

We always have to make a what?

What is that word we have to make a...

I think you can all do it together here.

On the count of three you're going to say it.

One, two, three.

Predictions.

That's right, you're fantastic.

So, I want you, as a group, to have a chat about what you think these materials are.

Don't put your fingers in there yet, but you can lift it up and have a little look.

And have a look at the sheet in front of you.

It says what it is here.

I predict that the something and the something will absorb water.

I predict that the something and the something will not absorb water.

So you have four different materials there.

Choose a scribe that will be the writer.

And that person will decide once you've had your conversation about what ones you're going to write down.

I'm going to give you five minutes now to discuss.

Have a little look and make your predictions.

Which materials absorb water?

15:28

Here, the teacher had the students predict which materials absorb water.
Which materials do you think absorb water?
Let's predict this together.

What was your prediction?
Let's go back to the class and listen to the students' predictions.

I think those two are going to dissolve.

It depends.

It depends on the chemicals.

Is it like, is it made of plastic?

I think, just based on common sense...

Well, if you have a look up there at the information I've given you, what does it say?

I call it sodium polyacrylate but it's called...

Sodium...plastic powder.

Plastic powder.

That might help you.

Sodium is salt.

And salt, doesn't salt dissolve in...oh, sorry, okay, wrong thing.

I like that you're talking through it though.

Yeah, it's just going to float.

The outside's too light, smooth.

It doesn't have any holes or anything.

I love these.

These are too hard as well.

There's not enough.

But doesn't that say that this is...

I've loved walking around and seeing all the predictions that you've made and lots of questions that you asked me as well about what you thought the properties were of those materials.

So I think the best thing to do now would be to test.

So when we do a test we really have to remember that it has to be fair, all right.

When we do a fair test, I like to remember we have to make sure that there's something to change.

That we're going to keep something the same.

And that that we're going to be able to measure it in some way.

So how are we going to change something here today?

What is the element that we're changing?

Yes.

Um, we're going to change the material that we're pouring the water.

Fantastic.

We're going to change the material.

What are we going to keep the same?

The amount of water that we pour in.

Fantastic.

And then lastly, how are we going to measure our experiment?

Think about those words we talked about at the start.

Um, based on the absorption and how the material dissolves.

That's correct.

And what do we call that when we're working as scientists?

We're going to observe the changes.

That's right we're going to use observation as our method of measurement today.

So, remember cows moo softly, or change, same and measure.

Alrighty, now I've placed some water on your tables.

And I've also placed one of these little measurement cups.

Remember, one of the parts of a fair test is making sure we use the same amount of water.

So for each of these different parts, we're going to use 20 mils of water.

So you have a test tube there with all the water you'll need.

And just for each one you'll pour 20 mils and make sure you're accurate.

And then when I say go, you can pour it in.

What we're going to do is, for each one, you'll take the other containers off and just have the one container in the middle of the plate.

Just as a safety precaution.

Also, make sure we're safe.

We've got our safety goggles on to go.

So the first one that we're going to do is the tissue.

And then we're going to do the pebbles.

Then we'll do the tablet, and finally the Styrofoam and the sodium polyacrylate.

So can I please get you to take the other containers out and just have the tissue in the middle of the table?

And then can you please pour the 20 mils of water into the container?

Now you've got a sheet on your table so make sure you're recording those observations down when you go.

So, let's go.

One, two, three, go.

All right, so having a look there, making sure you're making some observations there.

You can touch it if you like.

You can put your finger inside there and have a look.

It is safe to do.

What have you noticed about it?

It's absorbed a lot of the water.

It's still got looks like bunch.

Yeah absolutely.

So you can write something down.

You can tick it if you think it absorbs or it does not absorb.

It didn't absorb all of it but it did absorb some.

See it's expanded.

It's changed color.

It's gotten heavier than it was before.

So I think we can say it's absorbed water.

Fantastic, shall we move on to the next one?

Can you please move that one out of the way.

And we're going to put the pebbles in the middle now.

Make sure you measure out your 20 mils of water.

All right then, one, two, three, go.

And what do we notice this time?

I can't see any visible change.

Does it feel the same?

Is it just as heavy?

It feels the same, just as heavy.

It has not absorbed.

Not any softer, no color change.

I'm loving the scientific language that you're using.

Fantastic, shall we move on to the tablet?

I can see that at this table here they have said that the powder and the tissue will absorb water.

But you haven't said what the tablet is.

This will be a surprise for you.

All right, three, two, one, go.

It looks like it's dissolving, yeah.

It smells very orangey.

There's lots of bubbling.

What was that word that you used there?

You said it is... dissolving.

Dissolving, and that's one of our important words from the start as well.

So it's not absorbing, it is dissolving.

Definitely a chemical reaction.

Yes, it's a very big one.

[Laughter]

All right, let's put that one to the side.

Be a little bit careful with that one.

And let's move on to the Styrofoam ball.

Now you've said that this will not absorb water, so let's see if your prediction is correct.

All right, three, two, one.

And what can we observe about that?

It hasn't really absorbed any water.

It's still quite light, unlike the sponge.

It hasn't gotten any fluid.

You can tell it's light because it's still floating on top of the water and hasn't sunk down.

That's right, it's floating so it hasn't absorbed any water.

Yeah, it feels just as light as it did before.

There's not much visible change.

All right now, let's do our very last one here.

Now, you said that you think the powder will absorb water.

So let's put the powder in the middle of there.

And our lucky last one.

Three, two, one, and go.

Oh.

That's so cool.

So what are our observations?

Absolutely, you can touch it, you could tip a little bit out on the plate if you like and have a feel.

It's like snow.

That's so fun.

Wow, it's light.

So what are the properties of that now?

How has it changed?

Well all the things have expanded a lot because it's gotten a lot bigger.

Does it feel wet?

Yeah a little bit it.

It does.

And does it absorb?

100 percent.

There's no water left in there at all.

Fantastic, all right well, great experiment.

I'm going to give you a few moments to write down your observations and make sure you fill in your sheet and we'll move on to the next part of the lesson.

So that was a really exciting experiment.

I loved listening to all your observations and the surprise that you had about some of those chemical reactions.

So what did we see?

We talked about some of those predictions that we made and whether they were correct or not.

So, hands up if your predictions were correct.

Hands up if you had a prediction that was wrong and it really surprised you.

Did anyone have a prediction that they weren't sure of?

No?

Hands up if you predicted what would happen to the sodium polyacrylate.

Yes, did it surprise you in any way?

Yeah.

Yes?

It went a lot bigger than I expected.

Okay, instead of saying bigger, what scientific word?

Expanded a lot more.

That's right.

Now, what materials absorb the liquid?

Can we go through and have a look?

Which ones were they?

Yes, the tissue and the sodium...

Polyacrylate.

The sodium polyacrylate and the tissue.

Fantastic.

And what materials did not absorb the liquid?

The pebbles, the tablet, and the Styrofoam ball.

That's right.

Now the tablet was special in that it not only didn't absorb, it did something else.

What did it do?

There's that special word that we talked about at the start.

Right at the back there.

Um, the tablet dissolved in the water.

It dissolved and it had a really interesting chemical reaction as well, didn't it?

So what are some examples of how we use absorbing materials in our life?

Can you think about the sodium polyacrylate?

Have you seen that before?

Is there anything we might use it for?

How are absorbent materials used in our everyday life?

24:42

Here, the teacher asked the students how absorbent materials were used in our everyday life.
Let's think about this question together.

What was your opinion?
Let's go back to the class and listen to the students' opinions.

The sodium polyacrylate could be used for cleaning up spills, like chemical spills or something, so that they don't get everywhere and it's just easier to clean up.

Fantastic, yeah so they might put it on something that's a mess and they need to soak it up quickly and make it not slippery.

That's a great one.

Anyone think of any products that might use them?

So like you can get like fake snow and you just add water and it's basically just this.

Yeah, absolutely, use it at Christmas time, fake snow, you can.

Cleaning materials such as like sponges and mops.

Yeah, sponges and mops might have some element of sodium polyacrylate in there.

There's one really interesting one that I bet you can't guess it.

And it's something to do with babies.

Can anyone think of the one that might with babies?

What about you right here?

Nappies.

That's right, baby's nappies.

How do they keep all that liquid in there when babies use them?

And that is sodium polyacrylate, they're fantastic.

What about the dissolving?

When would we use the dissolving tablets?

Can anyone think of any reasons?

If you had a headache, you'd like dissolve a tablet of some sort.

Absolutely, you might use it if you have a headache.

They have tablets that dissolve in water, or they have vitamin tablets like that as well.

Also, another really interesting one is bath bombs.

They have that same kind of effect when you put them in there.

Great.

Now, lastly, before we finish let's talk about how we use these materials.

So, a tissue, we found is absorbent.

So it would be a really great material to help you with...

Spilled something you want to make better.

That's right, fantastic, because it's absorbent.

The most absorbent material that we found there today was...

The sodium polyacrylate.

That's correct.

Now a material that did not absorb water was...

Yes.

The pebbles.

Correct.

And how do you think, this is the one where I really want you to have a discussion with your teammates, how do you think we could make the experiment better?

What's another thing we could have done to give us more data or information?

Have a little chat with your group for just for two minutes.

How could we improve this experiment?

27:15

Here, the teacher asked the students a question.
How could we improve this experiment?

What was your opinion?
Let's go back to the class and listen to the students' opinions.

We probably could have tried with more materials and maybe more trials per things, so we can get it more accurate.

So make it more reliable and valid.

Make it a fairer test.

More materials and a bigger test subject.

Fantastic.

All right, so when we had that chat then, there were some really interesting things that were told to me.

This team here, you said that it could have been more fair by adding more materials, having more tests to do and making it a fairer test.

Over here, this table said that they could measure the water a bit more accurately to make it a fairer test.

And this group down here did you have something that you think we could have done better?

More materials, more water.

Oh, you wanted to add more water.

More reactions, fantastic.

Well I hope that you've had a fantastic time today exploring chemical reactions with me.

Can you remember that word that we were exploring today?

Anyone?

Absorption.

Fantastic, and I hope you've learned something today.

About that, and had a bit of fun too.

It's been a pleasure having you here in the Queensland classroom.

Closing by Kevin (the navigator)

28:53

How was today's session?
Absorption is a chemical reaction. Some materials absorbed water and others didn't. In addition, there was one material that did not absorb water, but instead dissolved in the water.
The students experimented with various materials and confirmed their results using the scientific method. The method involves starting with a question, making a prediction, carrying out an experiment, and making observations. Among these steps, making a prediction was an important element. It was impressive that they predicted the results before the experiment and verified whether the predictions were correct or incorrect.
In addition, the students worked together in groups to conduct experiments and actively discussed the results. I thought it was important to have teamwork and to be able to freely express one's own opinions. This is important not only in scientific experiments, but also in various other activities.
Please make use of what you learned today in your future studies. Well done! See you next time.