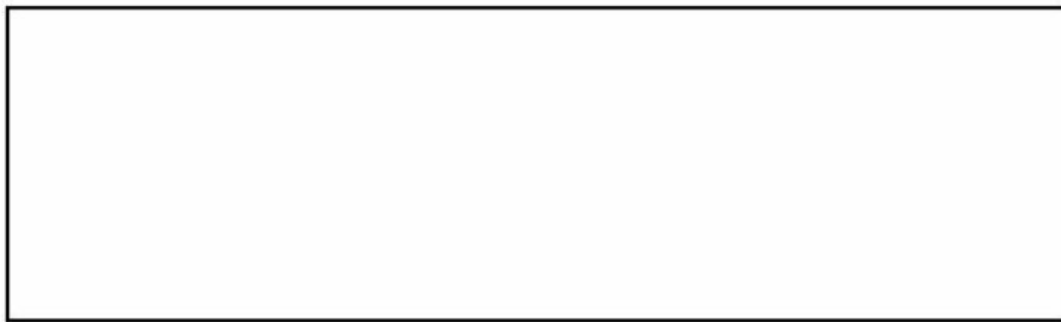


Cool as Cucumbers!

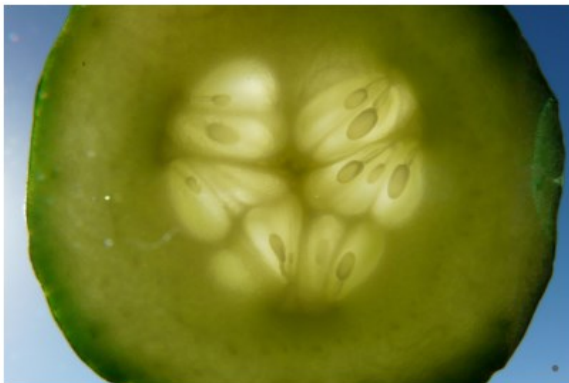
- One large cucumber.
- Knife and cutting board (for teacher/grown up use)
- White paper
- Toothpicks
- Hand lens or magnifying glass
- Microscope (if you have one)
- Enough worksheets for everybody



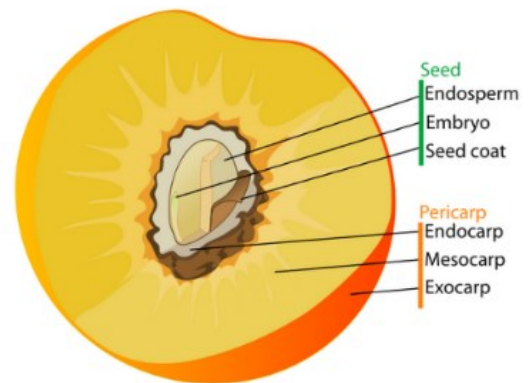
1. Look at the image right at the top of the page, you can clearly see the seeds bunched together in groups of four or five. Each seed has a tiny embryo – can you spot it? And how many seeds are inside each slice on the cucumber?
2. Before cutting it up, take a good look at your 'class cucumber' by passing it around. How does it feel? Cool or warm? Can you describe it? Can you see the seeds from the outside? Sniff the cucumber – what does it smell like?
3. Now, a teacher or another grown up will carefully slice through the 'class cucumber' and give everyone a slice to look closely at.
4. Now you have your slice of cucumber, place it flat on the white paper. Use toothpicks to carefully separate some seeds from the rest of the cucumber. Look closely at them with your hand lens. Draw what the seeds look like under the hand lens/microscope. Now you are becoming a seed scientist!



5. Look carefully at the images below. Label the diagram on the left using the same words as the peach seed diagram.



Close up of a cucumber



Peach seed diagram

- Which parts of your cucumber slice are the endosperm, embryo and seed coat?

- Which parts of the

cucumber slice are the endocarp, mesocarp and exocarp?

6. Now that you've had a good look at fresh cucumber seeds, put them aside so we can look at dried ones. You may see a big difference between your wet seeds and the dry seeds in the packet.

- A packet of dry cucumber seeds (from a garden shop or similar place)
- Sharp, pointed scissors
- Hand lenses



Before testing, get into groups of three students and discuss your scientific predictions.

I predict that the cucumber seeds will.... (circle the answer)

Float – Sink

Make a sound when dropped – Not make a sound when dropped

Have a visible embryo – Not have a visible embryo

Germinate – Not germinate

Now, you are ready to starting your experiments! Check the list below when you've completed each experiment.

- Float test
- Drop test
- Cut test
- Freeze test
- Dry test
- Wet test

1. Do the cucumber seeds float? Remember, filled seeds will sink while empty seed will float. Write your observation here.

2. Do your dry cucumber seeds make a sound when you drop them on a hard surface? Remember, scientists listen for the sound the seeds make when dropped onto a hard surface – empty seeds and filled seeds sound different. Describe the sound here.

3. Use sharp scissors to cut one of cucumber seeds in half then look at it very closely using a hand lens or microscope to look for the endosperm and embryo. This is what scientists call a 'cut test'. Write your observation here.

4. Draw what you see inside the cucumber seed.



Now that you've tested your cucumber seeds for 'fill', it's time to test for viability and germination. Remember, viability testing is learning whether a seed is alive or not. But germination testing is asking whether the seed is ripe enough.

5. Take some cucumber seeds from the packet and divide them into three groups for testing under the same conditions but with one variable. The variable you are going to change is 'storing' them three different ways before germination.

Freeze test	Dry Test	Wet test
At the Australian PlantBank, scientists use cryostorage to keep seeds for the future. Cryostorage means freezing the seeds at a very low temperature.	Some seeds don't need to be stored in any special way, just kept dry and safe. But not too dry! When seeds are too dry, this is called 'desiccation'	Some seeds don't mind getting their feet wet and in fact germinate faster if they've been kept wet.
Method: <ul style="list-style-type: none"> Place these cucumber seeds in the school freezer overnight. 	Method: <ul style="list-style-type: none"> Place these cucumber seeds somewhere dry and safe overnight. 	Method: <ul style="list-style-type: none"> Place these cucumber seeds in a glass jar of water overnight. You don't need to put a lid on top.

6. Now, it's time for the final stage of your experiment – **planting the cucumber seeds!** Take all of the three test groups and get ready to plant them. If all three sprout into plants, then you know that cucumber seeds can be stored frozen, dry or wet and still remain viable. If some don't sprout at all, then you know that some conditions just don't suit cucumbers.

Do you think all of the seeds will sprout? And will they sprout at the same time? Will some take longer than others? If yes, which ones?

To make sure you know which group is which, **prepare some labelled seedling trays.** You'll need three trays – one for each type of storage. Remember, it's important to keep everything in your experiment fair and accurate, so use the same soil for each tray, the same amount of water and put them in the same (sunny) position. Follow the instructions on the seed packet for more information.



Over the next few days and weeks, write your observations in your workbooks. You could write them as a "Diary of a Cucumber".

