STEM LITTLE EXPLORERS · CHRISTMAS SCIENCE LAB

24 DAYS OF CHRISTMAS SCIENCE

The STEM Advent Calendar

This calendar belongs to: _____

Do the experiment, then colour in the door. Weekend doors (in gold) are the bigger projects.

1 TUE

❄️

Make fake snow

2 WED

🎈

Dancing snowflakes

3 THU

✂️

Six-armed paper snowflakes

4 FRI

☕

Hot chocolate spoon race

5 SAT

⭐

Salt dough ornaments

6 SUN

🖌️

Paint your ornaments

7 MON

☃️

Fizzing, melting snowman

8 TUE

🔗

Möbius paper chain

9 WED

🎁

Stack the presents

10 THU

🍭

Crystal candy canes

11 FRI

🔔

Christmas sensory bin

12 SAT

🔮

Snow globe in a jar

13 SUN

☃️

Snowball catapult

14 MON

🌨️

Snowstorm in a jar

15 TUE

🔐

Secret Santa code

16 WED

🏠

Origami gingerbread house

17 THU

💻

Binary bead ornament

18 FRI

🦌

Cinnamon reindeer

19 SAT

🌲

Pinecone Christmas trees

20 SUN

🧻

Toilet roll Christmas tree

21 MON

🌍

The shortest day

22 TUE

💡

Potato-powered star

23 WED

🪐

Santa's sack on Mars

24 THU

🌕

The Christmas Eve moon

Every day's mini instructions

Tick each day when it's done. Full instructions and the science are on the website: open the calendar and tap a door.

- [ ] **1. Make fake snow** · 10 min · 3+
  Mix baking soda with a little white hair conditioner until it holds a snowball shape. Feel how cool it is, then build a tiny snowman.

- [ ] **2. Dancing snowflakes** · 10 min · 3+
  Cut tiny snowflakes from tissue paper. Rub a balloon on your hair, hold it above them and watch them jump up and dance.

- [ ] **3. Six-armed paper snowflakes** · 20 min · 5+
  Fold a square of paper into six sections instead of eight, then cut and unfold. Real snowflakes always have six arms.

- [ ] **4. Hot chocolate spoon race** · 15 min · 4+
  Stick a chocolate chip to a metal, a wooden and a plastic spoon with a dab of butter. Stand them in hot chocolate: whose chip slides off first?

- [ ] **5. Salt dough ornaments** · 1 h + drying · 3+
  Mix flour, salt and water, roll the dough out and cut stars, hearts and trees. Bake them low and slow, or let them air-dry.

- [ ] **6. Paint your ornaments** · 45 min · 3+
  Paint yesterday's ornaments, thread a ribbon through the hole and seal them so damp air can't soften them.

- [ ] **7. Fizzing, melting snowman** · 15 min · 3+
  Build a snowman from fake snow, then drip vinegar on it. It fizzes, melts away and even gets a little colder.

- [ ] **8. Möbius paper chain** · 20 min · 6+
  Make Möbius loops from red, green and gold paper. Predict, then cut one down the middle and one a third of the way in. Link the surprises into a garland.

- [ ] **9. Stack the presents** · 15 min · 5+
  Cut out 3 paper presents in different sizes and stack them. Move the whole stack to Santa's sleigh one present at a time, never putting a big one on a small one. It takes 7 moves. Then try 4 presents!

- [ ] **10. Crystal candy canes** · 30 min + a week · 6+
  Bend a red-and-white pipe cleaner into a candy cane and hang it in strong sugar syrup. Then wait: new crystals grow on it every day.

- [ ] **11. Christmas sensory bin** · 30 min · 3+
  Dye rice red, green and gold, then hide jingle bells, pinecones and cinnamon sticks in it. Shake the bin and listen: where are the bells?

- [ ] **12. Snow globe in a jar** · 1 h · 4+
  Glue a small figure to a jar lid, fill the jar with water, glycerin and glitter, and close it tight. Shake it and watch the snow fall slowly.

- [ ] **13. Snowball catapult** · 45 min · 5+
  Build the popsicle stick catapult and launch pom-pom snowballs at a paper-cup snowman. Which angle knocks him down?

- [ ] **14. Snowstorm in a jar** · 15 min · 4+
  Make the lava lamp with white paint mixed into the water and a pinch of silver glitter. Drop in a piece of fizzing tablet and watch a blizzard swirl up and down.

- [ ] **15. Secret Santa code** · 20 min · 7+
  Make a cipher wheel, then write a coded clue telling someone where their present is hidden. Whisper them the key number.

- [ ] **16. Origami gingerbread house** · 20 min · 5+
  Fold the origami house from brown paper and decorate it with white icing lines and paper sweets. Then fold a whole gingerbread village.

- [ ] **17. Binary bead ornament** · 30 min · 6+
  Look up your name in binary code. Thread a red bead for every 1 and a white bead for every 0, then bend it into a ring for the tree. JOY needs 24 beads; how many does your name need?

- [ ] **18. Cinnamon reindeer** · 30 min · 4+
  Glue three cinnamon sticks into a reindeer face with antlers and hang it on the tree. Did you know that both male and female reindeer grow antlers?

- [ ] **19. Pinecone Christmas trees** · 1 h + a walk · 4+
  Collect pinecones on a walk and decorate them as tiny trees. Bonus: put one in a glass of water and watch it close up.

- [ ] **20. Toilet roll Christmas tree** · 1 h · 4+
  Glue painted cardboard rolls into a tree: 6 in the bottom row and one fewer in every row above. How many rolls do you need in total?

- [ ] **21. The shortest day** · 10 min · 5+
  Today is the winter solstice. Push a skewer through an orange, tilt it a little and walk it around a lamp. When the top half leans away from the light, it's winter up there.

- [ ] **22. Potato-powered star** · 45 min · 7+
  Build a potato battery, push the LED through a paper star and light up the top of your Christmas tree. How many potatoes does it take?

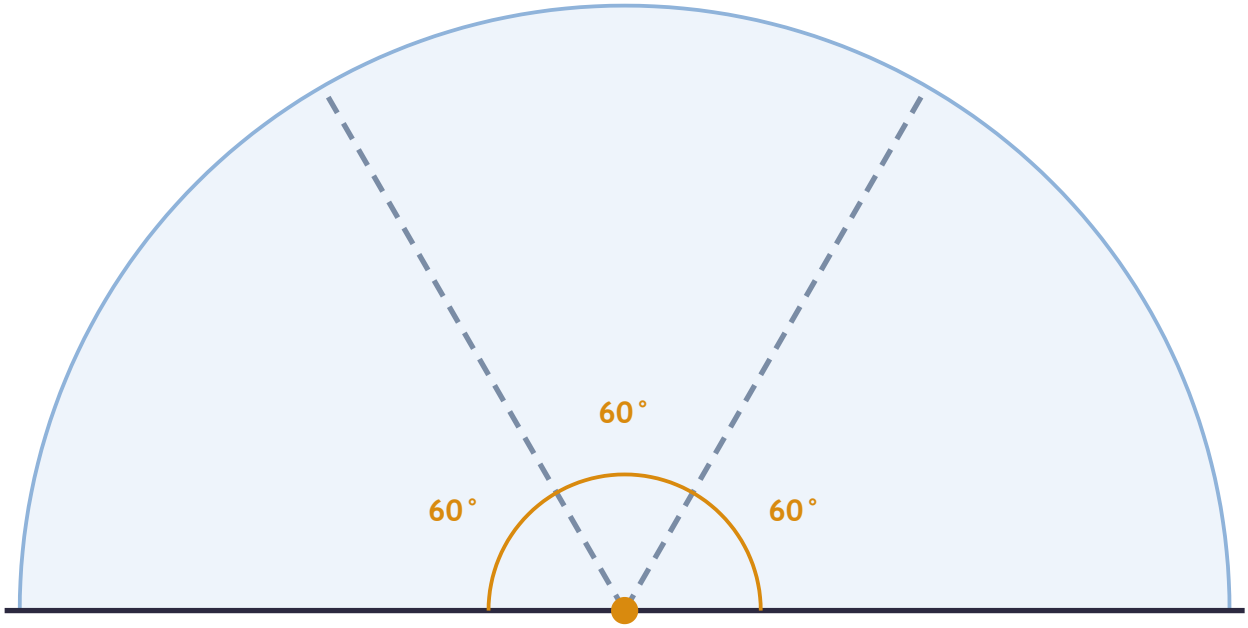
- [ ] **23. Santa's sack on Mars** · 10 min · 6+
  Estimate how heavy Santa's sack is (number of presents × weight of one present), then find out what it would weigh on the Moon, Mars and Jupiter.

- [ ] **24. The Christmas Eve moon** · 5 min · 3+
  On Christmas Eve 2026 the Moon is full. Look out of the window before bed: the Sun is lighting up the whole side that faces us.

❄ Six-armed snowflakes

Real snowflakes have six arms, so we fold the paper into six parts, not eight.

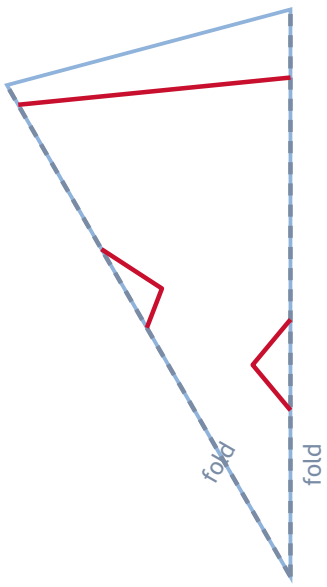
Folding guide (for a 15 cm square)



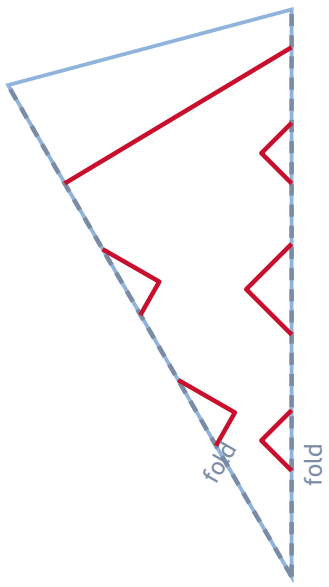
1. Fold the square in half, corner to corner. Pinch the middle of the folded edge.
2. Lay the triangle on the guide: folded edge on the bottom line, pinch on the gold dot.
3. Fold the right corner along the right 60° line, then the left corner over it along the left line.
4. Fold in half once more, so the two long edges meet. Now it's 12 layers thick.

✂ Cutting templates

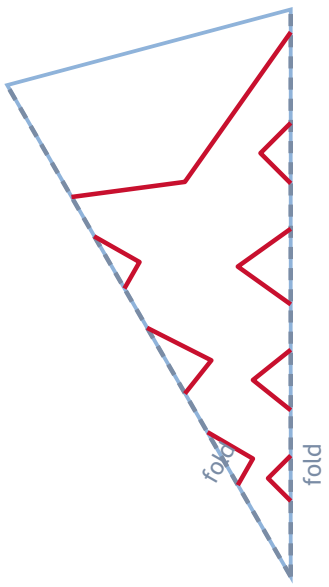
Cut out a template and lay it on your folded wedge with the point at the centre. Both long edges are folds. Trace the red lines and cut, but never cut all the way across!



Easy



Medium



Tricky

Gift tags: the science inside

Cut out, punch a hole and tie to your homemade presents.

Salt dough ornament

To: _____

From: _____

THE SCIENCE INSIDE

Salt pulls water out of mould and bacteria, so this ornament can last for years.

Snow globe

To: _____

From: _____

THE SCIENCE INSIDE

Glycerin makes the water thicker, so the snow falls slowly.

Paper snowflake

To: _____

From: _____

THE SCIENCE INSIDE

Real snowflakes have six arms because water freezes in rings of six.

Crystal candy cane

To: _____

From: _____

THE SCIENCE INSIDE

Sugar crystals grow when a very sweet syrup slowly cools down.

Cinnamon reindeer

To: _____

From: _____

THE SCIENCE INSIDE

The Christmas smell of cinnamon comes from a molecule called cinnamaldehyde.

Binary bead ornament

To: _____

From: _____

THE SCIENCE INSIDE

Every letter is 8 bits of code: red beads are 1, white beads are 0.

Origami house

To: _____

From: _____

THE SCIENCE INSIDE

Folded from one single sheet of paper, with no glue and no scissors.

Pinecone tree

To: _____

From: _____

THE SCIENCE INSIDE

Pinecones close in damp air and open when it's dry, to send their seeds flying.

Workshop rule: a grown-up stays for every experiment, and only food is for tasting.