Christmas Science for Your Class



FOR PRESCHOOL, PRE-K, AND KINDERGARTEN THROUGH GRADE 2

A Christmas book with a story to read aloud, a hands-on experiment, and talk questions for every adventure. Each experiment is linked to your curriculum.

PRESCHOOL AND PRE-K · Head Start ELOF

Every one of the 28 experiments for ages 3–5 gives children something real to observe and describe, and 22 invite a prediction, which is ELOF goal P-SCI 4. The stories give a natural reason to talk, so “scientific talk” happens without forcing it.

KINDERGARTEN THROUGH GRADE 2 · NGSS*

Of the 51 experiments, 33 link to at least one K–2 Performance Expectation (24 hands-on, 9 as teacher demonstrations), and all 51 use the Science and Engineering Practices. Where K–2 has no matching content (fizzing, gases, static), we point to the Grade 3 or Grade 5 PE.

51 short Christmas stories, each built around a value	**51** kitchen experiments, each with a real photo	**36** hands-on experiments
15 teacher demonstrations (flame or short circuit)	**3–9** years, always with an adult	**24** days in the December plan, ready to use

WHY IT WORKS IN CLASS

- Ready on a busy morning: everyday kitchen materials, and every step that needs an adult is marked.
- A real photo of every result, so children know what to look for.
- A value in every story, from honesty and patience to courage and forgiveness.
- Talk questions, plus science words explained in child-friendly language.



Try it free with your class

The first five days of the December plan are free at christmas-science.com. This guide, the curriculum tables, and the classroom routines are free too. Teachers can get the full book free with the code WITHLOVE100 at checkout.

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Preschool and Pre-K: Head Start ELOF

For preschool and pre-K educators (Head Start ELOF, Scientific Reasoning)

At a glance. Every one of the 28 experiments for ages 3–5 gives children something real to observe and describe, and 22 invite a prediction, which is ELOF goal P-SCI 4. The stories give a natural reason to talk, so “scientific talk” happens without forcing it.

ELOF goal	Experiments linked
P-SCI 1 Observes and describes phenomena	28
P-SCI 4 Asks a question, gathers information, makes predictions	22
P-SCI 3 Compares and categorizes	9
P-SCI 2 Engages in scientific talk	8
P-SCI 5 Plans and conducts investigations	7
P-SCI 6 Analyzes results, draws conclusions	6

TOP 10

10 Ice Melting Race (P-SCI 1, 3, 4), 11 The Floating Egg (P-SCI 1, 3, 4, 5), 12 Cornstarch Magic Snow (P-SCI 1, 2, 5), 14 Magic Static Balloon (P-SCI 1, 3, 4), 27 Grow a Giant Gummy Bear (P-SCI 1, 3, 6), 28 Color-Changing Cabbage Flowers (P-SCI 1, 4, 6), 31 Color-Changing Turmeric Gold (P-SCI 1, 3, 4), 41 Walking-Water Advent Wreath (P-SCI 1, 4, 6), 44 Golden Snowfall in a Glass (P-SCI 1, 2, 4), 45 Four-Layer Liquid Tower (P-SCI 1, 3, 4).

SUGGESTED SEQUENCE

Start with touch-and-see play (12, 24, 45), then simple comparisons (10, 11, 14), then predictions with a surprise (31, 44), and finish with “wait and see” investigations that run overnight (27, 28, 41), which build the patience the stories celebrate.

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Kindergarten through Grade 2: NGSS*

For K–2 teachers (NGSS)

At a glance. Of the 51 experiments, 33 link to at least one K–2 Performance Expectation (24 hands-on, 9 as teacher demonstrations), and all 51 use the Science and Engineering Practices. Where K–2 has no matching content (fizzing, gases, static), we point to the Grade 3 or Grade 5 PE.

NGSS area	Experiments
2-PS1 Matter and its interactions (2-PS1-1: 14, 2-PS1-2: 4, 2-PS1-4: 7)	25 (18 hands-on)
1-PS4 Light (1-PS4-2, 1-PS4-3)	3
K-PS2 Pushes and pulls (K-PS2-1)	2
K-2-ETS1 Engineering design (K-2-ETS1-2)	2
K-LS1 and 2-ESS2	1 each
Practices: SEP 3 Planning and carrying out investigations	25
Crosscutting Concept: Cause and effect	22
Look-ahead: 5-PS1-4 (new substances from mixing) / 3-PS2-1 (balanced and unbalanced forces)	14 / 6

TOP 10

44 Golden Snowfall in a Glass (1-PS4-2, 1-PS4-3), 10 Ice Melting Race (2-PS1-4, 2-ESS2-3), 12 Cornstarch Magic Snow (2-PS1-1), 41 Walking-Water Advent Wreath (2-PS1-2), 23 Upside-Down Water Glass (2-PS1-2), 28 Color-Changing Cabbage Flowers (K-LS1-1), 18 Fizzing Foam Rocket (K-PS2-1), 45 Four-Layer Liquid Tower (2-PS1-1), 33 Flour Detectives with Iodine (2-PS1-1), 5 Bubble Snake Beard (K-2-ETS1-2).

SUGGESTED SEQUENCE

Week 1 “What is it like?”: properties (12, 45, 24, 16). Week 2 “Which material is best for the job?”: testing (41, 23, 3, 5). Week 3 “Hot and cold”: 10 Ice Melting Race (melting can be reversed by freezing), then the teacher demonstration 9 Sugar into Caramel (cannot be reversed) as a pair for 2-PS1-4. 19 The Jumping Flame shows both: wax melts and hardens again, but burned wax is gone. Week 4 “Light, pushes, and living things”: 44, 18, 28, with 14 Magic Static Balloon as a Grade 3 teaser.

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A Lesson That Works

A pattern for a 35–50 minute school lesson. For preschool, keep the story, one prediction, and the experiment, about 15–20 minutes.

1. **Story time** 5–8 min
   Read the Christmas story aloud. Ask one question about how the character felt.

2. **Wonder question** 2 min
   Turn the story's problem into a science question: "Why did the egg float for Theo?"

3. **Predict** 5 min
   Children predict and give a reason. Preschool: thumbs up or down, or picture cards.

4. **Do and observe** 10–15 min
   Small groups follow the steps. Adults do every step marked for adults.

5. **Explain** 5–10 min
   Groups compare the result with their prediction. Then share the book's "Why it works" in child-friendly words.

6. **Connect the value** 3 min
   Link the story's value to how the scientists behaved: "We wrote down what really happened, even when our guess was wrong."

7. **Reflect and record** 5 min
   A drawing, a sentence stem, or a simple table.



THE PREDICT–OBSERVE–EXPLAIN ROUTINE

PREDICT
"I think … will happen because …"

OBSERVE
"I saw … I heard … I felt …" Use safe senses only, never taste.

EXPLAIN
"It happened because …" A wrong prediction is good science.

Experiments with a built-in surprise work best: 10 Ice Melting Race, 11 The Floating Egg, 16 Paper Clip on Water's Skin, 23 Upside-Down Water Glass, 44 Golden Snowfall in a Glass, 46 Pepper Skaters on the Pond.



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Safety in the Classroom

Follow your school's or setting's risk assessment and local science-safety guidance. The book marks every step an adult must do. In class, we suggest three levels:

GREEN
Children do it

Such as 8, 10, 12, 17, 24, 41, 45, 46.

AMBER
An adult does some steps

Knife or hot water (4, 22, 28), scissors or needle (3, 5, 36), iodine (33), alcohol (39), aerosol (25), launch (18), other adult steps (31, 42, 44, 48), balloons for children under 8 (14, 20, 36, 50).

RED
Teacher demonstration only

6, 9, 13, 15, 19, 21, 26, 29, 32, 34, 37, 38, 40, 47, 49. Children watch from about 2 m (6 ft) away. Some (21, 34, 37, 47) may not be allowed by school policy: show a video instead.



STANDING RULES

- Goggles for all fizzing, popping, and flame work.
- Nothing is tasted.
- Wash hands after raw egg.
- Food coloring and turmeric stain: use aprons and table covers.
- Tie long hair back near flames.
- Launches (1, 7, 18) outdoors only, never at faces.
- Cornstarch goo goes in the trash, not down the drain (12).



ALLERGIES AND CHOKING HAZARDS

Check for latex (use latex-free balloons), egg (6, 11, 42, 43), milk (4, 17, 33, 45), mustard (2), wheat flour (33), food dyes, and iodine. Gelatin (27) matters for some dietary and faith needs. Smoke (15) and aerosol (25) can trouble children with asthma. Uninflated or burst balloons are a choking hazard for children under 8, and small candies for children under 5 (8, 27). An adult keeps the fizzy tablets (7, 48).



GROUP ROLES

Groups of three or four, pairs with an adult in preschool. Share and rotate the roles: Story Keeper (asks the wonder question), Materials Manager, Scientist, Observer and Recorder, Safety Captain (goggles, distance, no tasting), and Reporter.



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All 51 Experiments 1/3

Every experiment in the book, with the closest curriculum links. Preschool links are given for the experiments the book rates 3+ to 5+. If the book age is above your students' age, demonstrate it.

No.	Experiment	Age	Mode	Head Start ELOF	NGSS*
1	The Cola Geyser	5+	Children	P-SCI 1, P-SCI 4	Practices only
2	Fizzing Mustard	3+	Children	P-SCI 1, P-SCI 2, P-SCI 4	Practices only (look-ahead 5-PS1-4)
3	The Unpoppable Balloon	6+	Adult step	–	2-PS1-2
4	Red Cabbage Color Magic	5+	Adult step	P-SCI 1, P-SCI 3, P-SCI 4	2-PS1-1
5	Bubble Snake Beard	5+	Adult step	P-SCI 1, P-SCI 2, P-SCI 5	K-2-ETS1-2
6	Egg in a Bottle	10+	Demo	–	Practices only (look-ahead 3-PS2-1)
7	Fizzy Tablet Rocket	8+	Children	–	K-PS2-1
8	Candy Rainbow Star	3+	Children	P-SCI 1, P-SCI 4	2-PS1-1
9	Sugar into Caramel	10+	Demo	–	2-PS1-4
10	Ice Melting Race	3+	Children	P-SCI 1, P-SCI 3, P-SCI 4	2-PS1-4, 2-ESS2-3
11	The Floating Egg	4+	Children	P-SCI 1, P-SCI 3, P-SCI 4, P-SCI 5	2-PS1-1
12	Cornstarch Magic Snow	3+	Children	P-SCI 1, P-SCI 2, P-SCI 5	2-PS1-1
13	The Thirsty Candle	10+	Demo	–	Practices only (look-ahead 3-PS2-1)
14	Magic Static Balloon	3+	Adult step	P-SCI 1, P-SCI 3, P-SCI 4	Practices only (look-ahead 3-PS2-3)
15	Smoke Waterfall	10+	Demo	–	Practices only (look-ahead 5-PS1-4)
16	Paper Clip on Water's Skin	5+	Children	P-SCI 1, P-SCI 4, P-SCI 5	2-PS1-1
17	Swirling Milk Colors	3+	Children	P-SCI 1, P-SCI 2, P-SCI 4	Practices only

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All 51 Experiments 2/3

No.	Experiment	Age	Mode	Head Start ELOF	NGSS*
18	Fizzing Foam Rocket	6+	Adult step	–	K-PS2-1
19	The Jumping Flame	10+	Demo	–	2-PS1-4
20	Self-Inflating Balloon	6+	Adult step	–	Practices only (look-ahead 5-PS1-4)
21	The Black Sugar Snake	10+	Demo	–	2-PS1-4
22	Fizzy Lemon Slices	5+	Adult step	P-SCI 1, P-SCI 4, P-SCI 5	Practices only (look-ahead 5-PS1-4)
23	Upside-Down Water Glass	5+	Children	P-SCI 1, P-SCI 4	2-PS1-2
24	Color Drops in Oil	3+	Children	P-SCI 1, P-SCI 3, P-SCI 5	2-PS1-1
25	The Bubbling Swab	7+	Adult step	–	Practices only
26	Lemon Sparkles in a Candle Flame	10+	Demo	–	1-PS4-2
27	Grow a Giant Gummy Bear	3+	Children	P-SCI 1, P-SCI 3, P-SCI 6	2-PS1-1
28	Color-Changing Cabbage Flowers	3+	Adult step	P-SCI 1, P-SCI 4, P-SCI 6	K-LS1-1
29	The Secret of Christmas Lights	10+	Demo	–	1-PS4-2
30	Salt Snow and Oil Bubbles	5+	Children	P-SCI 1, P-SCI 4, P-SCI 5	2-PS1-1
31	Color-Changing Turmeric Gold	3+	Adult step	P-SCI 1, P-SCI 3, P-SCI 4	2-PS1-1
32	An Orange Peel Oil Lamp	10+	Demo	–	2-PS1-2
33	Flour Detectives with Iodine	5+	Adult step	P-SCI 1, P-SCI 3, P-SCI 6	2-PS1-1
34	An Underwater Sparkler	10+	Demo	–	Practices only

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All 51 Experiments 3/3

No.	Experiment	Age	Mode	Head Start ELOF	NGSS*
35	Fizzy Foam Mountain	5+	Children	P-SCI 1, P-SCI 2, P-SCI 4	Practices only (look-ahead 5-PS1-4)
36	Balloon-Powered Fountain	5+	Adult step	P-SCI 1, P-SCI 4	K-2-ETS1-2
37	Vanishing Flash Paper	10+	Demo	–	2-PS1-4
38	The Invisible Fire Extinguisher	10+	Demo	–	Practices only (look-ahead 5-PS1-4)
39	Bright Snowflakes for the Tree	8+	Adult step	–	2-PS1-1
40	The Balloon-Swallowing Glass	10+	Demo	–	Practices only (look-ahead 3-PS2-1)
41	Walking-Water Advent Wreath	3+	Children	P-SCI 1, P-SCI 4, P-SCI 6	2-PS1-2
42	A Bouncy Egg for Santa's Sack	5+	Adult step	P-SCI 1, P-SCI 6	2-PS1-1
43	A Pink Snow Cloud in a Glass	6+	Children	–	Practices only (look-ahead 5-PS1-4)
44	Golden Snowfall in a Glass	3+	Adult step	P-SCI 1, P-SCI 2, P-SCI 4	1-PS4-2, 1-PS4-3
45	Four-Layer Liquid Tower	4+	Children	P-SCI 1, P-SCI 3, P-SCI 4	2-PS1-1
46	Pepper Skaters on the Pond	3+	Children	P-SCI 1, P-SCI 2, P-SCI 4	Practices only
47	The Blue Flame That Spares Paper	10+	Demo	–	2-PS1-4
48	A Bubbling Holiday Lava Lamp	3+	Adult step	P-SCI 1, P-SCI 2, P-SCI 4	2-PS1-1
49	Water Balloon vs. Candle Flame	10+	Demo	–	2-PS1-4
50	The Yeast-Powered Balloon	5+	Adult step	P-SCI 1, P-SCI 4, P-SCI 6	Practices only (look-ahead 5-PS1-4)
51	Marbled Swirls in Glue	6+	Children	–	Practices only

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Stories, Values, and Well-Being

Every story is built around one value. A five-minute talk after the experiment: Feel (how did the character feel?), Think (what choice did they make?), Do (when could we make that choice today?).

Value	Experiments	CASEL competency
Honesty	10, 19, 31, 33	Self-awareness
Patience	6, 12, 27, 42	Self-management
Perseverance	1, 11, 34, 40	Self-management
Learning from Mistakes	4, 16, 45, 51	Self-awareness
Courage	3, 21, 37, 49	Self-management
Responsibility	9, 29, 47	Responsible decision-making
Empathy	23, 28, 46, 48	Social awareness
Acceptance	8, 22, 39	Social awareness
Gratitude	13, 17, 26, 44	Social awareness
Forgiveness	18, 38, 43	Relationship skills
Helpfulness	5, 14, 32, 36	Relationship skills
Generosity	2, 41, 50	Relationship skills
Teamwork	7, 15, 20, 35	Relationship skills
Cooperation	24, 25, 30	Relationship skills

The table pairs each value with the closest framework idea. It is a planning aid, not a claim that a single story meets a standard on its own.

WORKING WITH FAMILIES

Green experiments make good take-home cards, and families can continue with the book at home.

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About This Guide



Janka Sára Molnár

About Janka

Janka Sára Molnár is a physicist and award-winning science communicator from Hungary, and the creator of FUNtastic Christmas Science. Her mission is to show children and adults that science is easy to love, easy to understand, and part of everyday life. As a high school student, she spent years building multiwire proportional chambers, a kind of particle detector, and took them to CERN several times, where she also presented them in the CERN teacher program. She later graduated from Eötvös Loránd University (ELTE) in Budapest.

BEFORE YOUR FIRST LESSON

- Check allergies and your setting's risk assessment (page 5).
- Choose the experiment and check its mode in the tables (pages 6–8).
- Gather the materials the day before, and try the experiment once yourself.
- Cover the tables, set out goggles, and keep paper towels and a trash bag close.
- Send a short note home about the project and the no-tasting rule.

SOURCES

Head Start Early Learning Outcomes Framework (2015), Next Generation Science Standards (2013), CASEL. NGSS* is a registered trademark of WestEd. Neither WestEd nor the lead states and partners that developed the Next Generation Science Standards were involved in the production of this product, and do not endorse it. All frameworks were checked on November 6, 2026.



Theo & Tilda's Christmas Science Adventure

51 stories, 51 experiments with real photos, and a 24-day December plan. The first five days are free at christmas-science.com.

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