FAIRGAME INITIATIVE

Science Fairs Without Barriers

Cross-Curricular Science Fair Curriculum

Grades 5–8 · First Semester · OAS State Science Day Pathway

A project-based framework delivered across Science, ELA, Math, History, Art, and Electives

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Why This Curriculum Exists

Science fairs are not evenly distributed. Schools in rural and high-poverty areas are far less likely to have established programs or the network to run a fair. FairGame exists to close that gap by giving every school the resources, and support to make science fair participation a real option for every student.

This curriculum treats science fair preparation as project-based learning, not a single-subject add-on. The work is deliberately spread across multiple classrooms because good science actually happens across multiple disciplines. Students do not just need to run an experiment; they need to ask a good question (inquiry), read carefully (ELA), calculate accurately (Math), understand context (History or Social Studies), communicate clearly (public speaking), and present their findings visually (Art). That is the same skill set every teacher is already building.

> **Core design principle: the science fair is the project. Every assignment in this guide is a real deliverable that students will use in competition, not busy work added on top of existing coursework.**
>
> **AI and authenticity: science journals and in-class checkpoints are the primary safeguards. Students who keep a genuine record of their process cannot fabricate it. Journal collection every three weeks is a non-negotiable expectation at all grade levels.**

The Cross-Curricular Map

Below is the classroom breakdown for each phase of the project. Teachers do not need to coordinate every lesson, but they do need to know what the other classrooms are working on so students hear a consistent vocabulary and timeline.

Phase	Science Class	ELA	Math	Social Studies	Art / Elective
Asking the Question	Testable question, variables, OAS categories	Reading science texts, evaluating sources	Statistical question vs. non-statistical question	Context of the problem	Sketchbook: initial brainstorm visuals
Background Research	Scientific method overview, credibility of evidence	Note-taking, summarizing, citing sources	Ratios, percentages in data contexts	Real-world application of the research topic	Thumbnail sketches of possible display layouts
Experimental Design	Variables, controls, safety, procedure writing	Technical writing: step-by-step procedures	Sampling, number of trials, measurement tools	Historical or societal relevance of the experiment topic	Mood board for display board aesthetic
Data Collection	Running the experiment, lab notebook entries	Daily journal entries, observation writing	Data tables, mean, range, graphing	N/A (class focus is execution)	Photography or sketching of experiment in progress
Analysis & Conclusion	Interpreting results, claim-evidence-reasoning	Conclusion paragraph writing, revision	Graph construction, trend description, averages	Connecting results to real-world impact	Final display board layout and typography
Presentation	Practice Q&A with teacher as judge	Oral presentation structure, public speaking standards	Explaining data verbally with precision	Audience awareness: who cares about this result?	Final display board design and assembly

The Science Journal

Every student in every grade maintains a science journal from the first day of the unit through their final presentation. The journal is the paper trail that teachers and judges rely on. It is also, practically speaking, the best tool available for discouraging the use of AI to fabricate work.

The journal is submitted to the teacher every three weeks for a signature and brief written feedback. Students should ask clarifying questions in person before the next collection date, not during it.

The journal travels with the student across classrooms. All teachers on the team may write comments in it.

At competition, the journal may be shown to judges as evidence of authentic process work.

What Goes in the Journal

- Date and time of every work session, even short ones
- Written observations during every experiment trial what was seen, heard, or measured
- Questions that came up during the process and how they were answered
- Sketches, diagrams, and draft data tables
- Notes from any interview, mentor conversation, or background reading
- A running log of hours worked on the project
- Any time the original plan changed and why

Journal Collection Schedule

Collection	Approx. Date	What the Teacher Reviews
Check 1	End of Week 3	Question is testable, hypothesis is written, at least one background source cited
Check 2	End of Week 6	Experimental design is complete, procedure is written, materials are identified
Check 3	End of Week 9	Data collection is underway or complete, data table has real entries
Check 4 (Final)	End of Week 12	Complete record from start to finish; used as part of presentation evaluation

Timeline flexibility: Science fairs in Ohio typically run December through February for OAS regional and district events. Data collection must be complete before winter break. Build the journal check dates backward from your school's fair registration deadline, not forward from the first day of school. Every school will shift these dates by a week or two, that is expected and fine.

Cancellations and delays: schedule one buffer week before each major milestone. If a week of instruction is lost to testing, assemblies, or school closures, it isn't a huge issue.

GRADES 5–6

Guided Experiments · Fully In-Class · First Semester

Grade Philosophy

Students in grades 5 and 6 are introduced to the scientific process through a curated set of pre-approved experiments. They experience genuine inquiry with the initial parts of an experiement, but are then guided toward a menu of projects that can be completed entirely in school with materials the teacher provides. This removes the barrier of parental involvement and ensures equity, so every student can participate regardless of what is available at home.

The first nine weeks of the semester walk all students through the process together. In the second nine weeks, teachers identify students ready for independent competition entry at OAS and provide additional support to that group. All students complete a simplified display board as a class project. Selected students complete a full OAS-eligible project.

Experiment Option	Subject Area	What Students Measure	Cross-Curricular Connection
Does water temperature affect how fast sugar dissolves?	Physical Science / Chemistry	Time to dissolve (seconds); grams of sugar	Math: graphing time vs. temperature; Art: diagram of molecular motion
Which paper towel brand absorbs the most water?	Physical Science / Engineering	Volume absorbed (mL); cost per unit	Math: unit rate and cost comparison; ELA: consumer report writing
Does the color of light affect plant growth?	Life Science / Biology	Plant height (cm) over two weeks; leaf count	Art: botanical sketching of weekly growth; History: photosynthesis discovery timeline
Does music tempo affect resting heart rate?	Health / Life Science / PE	Heart rate (BPM) before and after listening	PE: heart rate measurement; ELA: connecting to wellness research
Which surface produces the most friction for a sliding object?	Physical Science	Distance traveled (cm); number of trials	Math: averaging multiple trials; Art: diagram of surface textures
Does soil type affect how fast water drains?	Earth Science / Environmental	Drainage time (seconds) per soil type	History: soil and agriculture in your region; Art: soil sample display
How does the amount of air in a ball affect bounce height?	Physics / PE	Bounce height (cm) at different PSI values	PE: equipment science; Math: graphing PSI vs. height

Semester 1 Timeline: Grades 5–6

Weeks	Phase	Primary Classroom	What Students Do
1–2	Curiosity and Question	Science	Brainstorm interests, explore experiment menu, select project, begin journal
3	Background Research	ELA / History	Read one article on the topic, write a summary, note one real-world connection
4	Hypothesis and Design	Science	Write a hypothesis, identify variables, complete simple experimental design form
5	Materials and Safety	Science	List materials, review safety rules, set up data table in journal

6–8	Data Collection	Science (in class)	Run experiment with teacher guidance; minimum three trials; record in journal
9	Data Analysis	Math	Calculate averages, construct a bar or line graph, describe the pattern in writing
10	Conclusion and Report	ELA	Write a conclusion paragraph using CER; begin short written report (intro + conclusion)
11	Display Board	Art / Science	Design and assemble display board using FairGame Display Board Template
12	Presentation Practice	ELA / Science	Practice 2-to-3 minute oral explanation; receive peer and teacher feedback
13+	OAS Prep (selected students)	Science / ELA	Complete full OAS registration paperwork with teacher; prepare for regional fair

Standards Addressed: Grades 5–6

OHIO LEARNING STANDARDS FOR SCIENCE (OLS 2018) GRADES 5–8 INQUIRY BAND

- Identify questions that can be answered through scientific investigations
- Design and conduct a scientific investigation with appropriate controls
- Use mathematics and measurement tools to gather and record data
- Analyze and interpret data to develop explanations
- Communicate scientific procedures and explanations

CCSS ELA / LITERACY IN SCIENCE GRADES 6–8 (RST AND WHST STRANDS)

- RST.6-8.1: Cite textual evidence to support analysis of science and technical texts
- RST.6-8.3: Follow precisely a multistep procedure when carrying out experiments
- WHST.6-8.2: Write informative/explanatory texts including narration of scientific procedures
- WHST.6-8.4: Produce clear writing appropriate to task, purpose, and audience
- SL.6-8.4: Present claims and findings in a focused, coherent manner (public speaking)

CCSS MATHEMATICS GRADES 6–7

- 6.SP.A.1: Recognize a statistical question as one anticipating variability in data
- 6.SP.B.4: Display numerical data in plots (dot plots, bar graphs, line graphs)
- 6.SP.B.5: Summarize numerical data sets in context (mean, range)
- 7.SP.A.1–2: Use random sampling; draw inferences from data

Teacher Notes: Grades 5–6

- **Parent involvement:** intentionally minimal. All materials are provided by the school. Students do not need to bring anything from home. The journal stays at school between check-in dates.
- **The menu is not a limitation:** students genuinely choose within the menu, and their choice of surface type, plant species, or music genre within an experiment category gives them real ownership without creating equity gaps.
- **Phys Ed connection:** the ball-bounce and heart rate experiments connect directly to PE class. Coordinate with the PE teacher for heart rate measurement and equipment access.
- **Art connection:** display board design is a graded art assignment in schools that have adopted this curriculum. Students apply principles of layout, color, and typography from their art class to their display board. The FairGame Display Board Template provides the structure; students make aesthetic decisions.
- **Wiggle room:** plan for one experiment session to be lost to scheduling conflicts. Three data-collection days instead of four still produces enough trials for a valid result on any menu item.

GRADE 7

Open Topic · Mostly In-Class · Some Home Experimentation by Topic

Grade Band Philosophy

Seventh graders choose their own topic, which gives them the motivation to follow through on a longer process. However, the structure of the curriculum keeps most of the work happening in class, where teachers can monitor progress and provide real-time feedback. Experimentation may happen at home for projects that require time-based observation, but in-class data collection is strongly preferred wherever possible.

The key shift from grades 5 and 6 is that students are responsible for their own question and design. Teachers move from directing to coaching. The milestone structure and journal requirements keep students from falling behind without the teacher having to manage every step.

> **The "what's the point" question: seventh graders need to know why their project matters before they will commit to it. Build this into the topic selection process. A student testing whether Gatorade grows plants should be pushed toward a more meaningful framing: what does that tell us about natural additives in water? What agricultural or environmental problem does it connect to? The experiment becomes compelling when students can answer: if my hypothesis is correct, why should anyone care?**
>
> **Topic examples that have worked well with middle schoolers: temperature effect on pickleball bounce, surface type and traction testing, natural water additives and plant growth, noise level and reading comprehension, sleep duration and reaction time. These are testable, relevant, and completable in a semester.**

Semester 1 Timeline: Grade 7

Week	Phase	Primary Classroom	What Students Do
1	Topic Exploration	Science / History	Brainstorm freely, identify a real-world problem their project connects to, begin journal
2	Testable Question	Science	Narrow topic to a testable question; identify independent and dependent variables
3	Background Research	ELA	Read two credible sources; complete source summary sheet; identify what is already known
4	Hypothesis	Science	Write if-then-because hypothesis; peer review with partner
5	Experimental Design	Science	Identify all three variable types; write procedure (minimum 8 steps, 3 trials)
6	Materials and Feasibility	Science / Home prep	Complete materials list; flag anything unavailable; teacher approves design
7–9	Data Collection	Science or Home	Run experiment; record every trial in journal; note unexpected observations
10	Data Analysis	Math	Calculate averages; construct appropriate graph; write pattern description
11	Conclusion	ELA / Science	Write CER conclusion; draft short research report (intro, methods, results, conclusion)
12	Display Board	Art / Science	Design and assemble board; apply Display Board Checklist
13	Presentation Prep	ELA	Draft oral presentation outline; practice with partner; receive feedback
14	Practice Fair	Science / ELA	Present to small group with teacher as judge; respond to questions; self-assess

Standards Addressed: Grade 7

OHIO LEARNING STANDARDS FOR SCIENCE (OLS 2018)

- All eight inquiry abilities for grades 5–8 (see Grades 5–6 section above)
- Additional grade 7 content connections: ecosystems, physical science, and Earth science topics align with OLS content standards depending on student project selection

CCSS ELA / LITERACY IN SCIENCE

- RST.6-8.1, RST.6-8.2, RST.6-8.8: reading and evaluating science sources
- WHST.6-8.1: argumentative writing via claim-evidence-reasoning conclusion
- WHST.6-8.2: informative writing via procedure and methods section
- WHST.6-8.7, WHST.6-8.8: conducting research, assessing source credibility, citing sources
- SL.6-8.4, SL.6-8.5: oral presentation including visual display (display board)

CCSS MATHEMATICS

- 6.SP.A.1–3, 6.SP.B.4–5: statistical questions, data displays, measures of center
- 7.SP.A.1–2: sampling and inference from data
- 7.SP.B.3: comparing distributions from multiple trial sets

Teacher Notes: Grade 7

- **Hypothesis flexibility:** students should know from the start that they are allowed to revise their hypothesis before data collection begins if their design reveals a flaw. This is not a failure; it is how science works. Build a formal “hypothesis check” into the design approval step.
- **Design flexibility:** similarly, students may adjust their experimental design during data collection if a procedure step is producing unreliable results. Changes must be documented in the journal with a dated explanation.
- **Bootleg materials:** students do not need lab equipment. Everyday materials (rubber bands, cardboard, measuring cups, thermometers from a pharmacy, kitchen scales) produce valid data for most middle school projects. Teachers should communicate this clearly to students who feel their project is “not scientific enough” because they are not using expensive tools.
- **History connection:** the topic exploration week in History class grounds the experiment in a real-world context. A student studying plant growth connects to agricultural history and food deserts. A student studying friction connects to road safety and infrastructure. This is where the cross-curricular framework earns its value.
- **Elective connections:** music projects (tempo and mood, frequency and resonance, rhythm and reaction time) can involve the music teacher. Surface and traction projects can involve the PE teacher. Do not force these connections, but note them when they arise naturally.

GRADE 8

Student-Led · Class Milestones Keep Them On Track · Primary Work Outside Class

Grade Band Philosophy

Eighth graders are expected to operate with independence. Class time acts as a checkpoint instead of a teaching sequence, and students arrive to class having completed a deliverable, receive feedback, and leave with a next step. The teacher's role shifts further toward coaching and deadline management.

This structure respects the reality that older middle schoolers have more complex schedules and varying levels of home support. The milestone system doesn't assume students have unlimited evening time; it does assume they are managing their own time. Students who fall behind the milestone schedule receive an immediate check-in conversation, not a grade penalty on the final project.

> **The objective question: eighth graders need a compelling personal reason to invest in this process. Before any student starts, they should be able to answer: why does this topic matter to me? Who else would care about this result? If a student cannot answer both questions, the topic needs more development.**
>
> **Teachers willing to step into the unknown: the most important quality in an eighth grade science fair teacher is comfort with "I don't know, let's figure it out together." Students who choose topics outside the teacher's expertise are doing harder science.**

Semester 1 Milestone Schedule: Grade 8

Class sessions in weeks without a milestone are used for brief journal check-ins, troubleshooting, or peer consultation. Teachers do not deliver new content in most of these weeks, but they circulate and coach while students work.

Milestone	Due Date	Deliverable	Class Time Used
M1: Topic and Objective	Week 2	One paragraph: what is the question and why does it matter to anyone	15 minutes - share with class, receive verbal feedback
M2: Background Research	Week 4	Source summary for two to three credible sources; annotated bibliography started	20 minutes - peer source review; teacher flags weak sources
M3: Hypothesis and Design	Week 6	Written hypothesis + experimental design diagram + procedure draft	One full class period - design review with teacher
M4: Journal Check 1	Week 6	Journal submitted; research and planning phases visible	Teacher takes journal for weekend; returns with written comments
M5: Data Collection Update	Week 9	Written update: what has been collected, what is still needed, any design changes made	10 minutes - verbal update to teacher; adjust plan if needed
M6: Journal Check 2	Week 9	Journal submitted; data section has real entries	Teacher spot-checks journal for authenticity and completeness
M7: Data Analysis	Week 11	Completed data table with averages; graph; pattern description paragraph	20 minutes math teacher available to review graphs if coordinated
M8: Conclusion and Report Draft	Week 12	CER conclusion + first draft of full research report	One class period peer revision of conclusion paragraph
M9: Display Board and Abstract	Week 13	Completed board; 200-250 word abstract	20 minutes teacher reviews against OAS Display Board Checklist
M10: Practice Presentation	Week 14	Full 5-to-7 minute oral presentation to small group	One class period practice fair format with judge questions

Standards Addressed: Grade 8

OHIO LEARNING STANDARDS FOR SCIENCE (OLS 2018)

- All eight inquiry abilities for grades 5–8 at full independence
- Grade 8 content connections: physical science, Earth science, and life science topics per OLS content standards connected to student-selected project areas

CCSS ELA / LITERACY IN SCIENCE FULL GRADE 8 APPLICATION

- RST.6-8.1 through RST.6-8.10: reading, evaluating, and synthesizing science and technical texts independently
- WHST.6-8.1: argumentative writing claim, evidence, reasoning in the conclusion
- WHST.6-8.2: full research report as an informative/explanatory text
- WHST.6-8.5: planning, revising, and editing the research report across multiple drafts
- WHST.6-8.7, WHST.6-8.8: extended independent research project with source evaluation and citation
- SL.8.4, SL.8.5: formal oral presentation with multimedia (display board) to a mixed audience

CCSS MATHEMATICS GRADE 8 EXTENSIONS

- 8.SP.A.1: scatter plot construction for bivariate data (applicable projects)
- 8.SP.A.3: interpreting slope of a linear model in context of bivariate data
- All grade 6 and 7 statistics standards applied at greater independence

Teacher Notes: Grade 8

- **Data before winter break is non-negotiable:** communicate this from day one. Any student whose project requires time-based observation (fermentation, plant growth, behavioral tracking) must begin data collection no later than week 6. There is no path to a complete project if data collection starts in January.
- **Authenticity and AI:** eighth graders are more likely than younger students to attempt AI-generated writing. The journal is the primary safeguard. A student who has genuine daily entries, real data, and dated sketches cannot have fabricated the process. For the written report, short in-class writing sessions during milestone check-ins provide a comparison baseline.
- **The journal as a grade:** consider grading journal completeness at each check-in rather than grading final outputs only. A student who kept a thorough journal and had a hypothesis not supported by data has done excellent science. A student with a perfect conclusion and an empty journal has not.
- **FFA and agriculture programs:** schools with FFA programs have a natural pipeline for science fair participation. FFA project work in animal science, plant science, and agribusiness can be adapted for OAS submission with minimal additional effort. Reach out to the FFA advisor early in the semester. FairGame can provide resources and mentor connections for FFA students pursuing OAS.

OAS Science Day

The Ohio Academic Science competition (OAS) is the primary competitive pathway for K–12 students in Ohio. Regional and district fairs run December through February, with State Science Day held annually in Columbus. Every deliverable in this curriculum maps directly to OAS submission requirements.

OAS Requirement	This Curriculum's Deliverable	When It Is Ready
Testable research question	Milestone 1 / Lesson 2 (Grades 5–7) / M1 (Grade 8)	Weeks 1–2
Written hypothesis (if-then format)	Hypothesis handout / Milestone 3	Weeks 3–6 by grade
Experimental procedure (replicable steps)	Procedure writing lesson / Milestone 3	Weeks 4–6 by grade
Data table with multiple trials and averages	Journal entries + Milestone 7 / Data Analysis lesson	Weeks 7–10 by grade
Graphs of results	Math class graph construction / Milestone 7	Weeks 9–11 by grade
Written conclusion (CER format)	Conclusion writing lesson / Milestone 8	Weeks 10–12 by grade
Research paper (Abstract, Intro, Methods, Results, Discussion, Conclusion)	ELA writing unit / Milestone 8	Weeks 11–13 by grade
Display board (OAS-compliant, 48" × 36")	Art / Display Board lesson / Milestone 9	Weeks 12–13 by grade
Oral presentation to judges	Practice Fair / Milestone 10	Weeks 13–14 by grade

OAS registration is completed through ProjectBoard (oas.projectboard.net). The FairGame OAS ProjectBoard Walkthrough Guide (free at fairgameinitiative.org) provides step-by-step instructions with screenshots. Teachers completing this process for the first time should allow 45 minutes to walk through registration for their school.

FairGame is currently partnering with up to 10 schools for the 2026–27 school year. Partner schools receive access to the full FairGame teacher portal, including downloadable resources, OAS registration support, judge recruitment assistance, and mentor matching through the Industry Mentorship Program.

To register your school as a FairGame partner or to request resources, contact Kyla Fallis at fairgameinitiative@outlook.com or visit fairgameinitiative.org.

Free Resources for Teachers and Students

Every resource below is available at no cost at fairgameinitiative.org. Teachers with a FairGame portal account can access all files from the teacher resource library. Students with an ambassador or teacher-assigned account can access the student-facing resources directly.

Resource	Who Uses It	Grade Band
Student Worksheet Pack (all phases)	Students	5–8
Experiment Menu (Grades 5–6)	Teachers and Students	5–6
Science Journal Template	Students	5–8
Source Summary Sheet	Students	5–8
Hypothesis Builder handout	Students	5–8
Experimental Design Diagram	Students	5–8
Lab Notebook Data Table	Students	5–8
Display Board Template (48” x 36”, OAS-compliant)	Students	5–8
Display Board Checklist	Students and Teachers	5–8
Research Paper Template (.docx)	Students	7–8
Abstract Writing Template	Students	7–8
Grading Rubrics Pack (4 rubrics)	Teachers	5–8
Milestone Tracking Sheet (Grade 8)	Teachers	8
OAS ProjectBoard Walkthrough Guide	Teachers	5–8
2026 OAS Judging Score Cards (Vertical and Horizontal)	Teachers and Judges	5–8
Budget Template (.xlsx)	Teachers and Students	5–8
12-Month Planning Checklist (school setup)	Teachers	5–8
Day-of-Event Checklist (fair logistics)	Teachers	5–8