



L U M E N

CATHOLIC FAMILY ACADEMY

Session 1

Gears & Machines: The Inventor's Workshop

Early Sep → mid-Oct · Ordinary Time · 2026–27

Pillar 1 · Called · The Word

The complete Guide's booklet — overview, all five weekly briefs, studio tracks, resources, and daily prayers.
The Kolbe Family



LUMEN

CATHOLIC FAMILY ACADEMY · THE KOLBE FAMILY

Session 1 of 7 — Gears & Machines: The Inventor's Workshop

Early Sep → mid-Oct · Ordinary Time · 2026–27 · The Word · Mechanical Engineering

The family workshop has been commissioned by “Da Vinci & Sons, Ltd.” Every learner is a new apprentice inventor who must master the six simple machines, earn their toolbox rights, and design an original machine that solves a real problem in your home.

Driving question: How do simple machines multiply human strength — and what could YOU build to make someone's work lighter?

Exhibition: Invention Convention: each learner demos an original machine to a live audience, explains the physics, and answers judges' questions.

Badges on offer: Simple Machines Master · Toolbox Rights · Original Invention (exhibited)

✠ The Saint's Journey — Pillar 1: Called

The year opens with identity. Before a learner does anything, they are told who they are: created on purpose, in the image of God, baptized into Christ, known by name, guarded by angels, destined for sainthood. The Acton question “who am I becoming?” gets the Catholic answer: a saint — which is simply yourself, fully alive in God.

Virtues: Faith · wonder · gratitude · **Scriptures:** Genesis 1:26-27 · Psalm 139 · Jeremiah 1:5 · Ephesians 2:10

This year's lens: Called: In the Beginning (Genesis 1-11) — Creation, the image of God, the Fall, the Flood, Babel. Identity session meets identity chapters: you are made, made good, made for God, and something has gone wrong that God himself will fix.

Seedling (5–7)	Memory: Genesis 1:1 and the days of creation
Disciple (8–10)	Memory: Genesis 1:27 and the order of Genesis 1-11 events
Apostle (11–13)	Memory: Psalm 139:13-14 and the four marks of the imago Dei (reason, freedom, relationship, stewardship)
Missionary (14–18)	Memory: Genesis 3:15 (the protoevangelium) with its Christological reading

The five weeks at a glance

W1 · The Apprentice Oath	Narrative launch. Learn the six simple machines (lever, wheel & axle, pulley, inclined plane, wedge, screw) through stations built from household objects. Machine scavenger hunt: find 20 machines hiding in your house.
W2 · Toolbox Rights	Real tools, real safety: measure, cut, drill, sand, fasten (by studio level). Each learner passes a tool-safety check to earn “toolbox rights.” Build the classic challenges: catapult (lever), zip-line pulley rescue, marble run.
W3 · The Rube Goldberg Trials	Teams build a Rube Goldberg machine using at least 4 simple machines and 8 steps. Iterate daily; document failures in the build log. Physics vocabulary (force, work, mechanical advantage) drilled through the build.

W4 · The Client Problem	Each learner interviews a family member about a chore that's hard, then designs an original machine to lighten it. Sketch → prototype → critique circle → revise (the heart of the quest).
W5 · Polish & the Convention	Final builds, demo speeches rehearsed (30–60s per studio level), signage and invitation made by learners. Final Friday: Invention Convention exhibition with judges' Q&A.

Guide's prep budget: 1–2 hours before the session (this booklet is that prep), then 10–20 minutes per week with the weekly brief.



LUMEN

CATHOLIC FAMILY ACADEMY · THE KOLBE FAMILY

Gears & Machines: The Inventor's Workshop

W1 · The Apprentice Oath · Guide's Weekly Brief · Stage: Launch & Learn · Session 1 of 7 · 2026–27

The arc of this week. This is the narrative week: light the story on fire and lay the knowledge foundation. Novices need explicit teaching before free exploration — resist the urge to skip to building.

This quest, this week: Narrative launch. Learn the six simple machines (lever, wheel & axle, pulley, inclined plane, wedge, screw) through stations built from household objects. Machine scavenger hunt: find 20 machines hiding in your house.

Your role: Guide sets up 6 stations Sunday night (30 min). Daily: run one station challenge, ask “where else have you seen this?” Never explain a mechanism the child can discover.

Before the week starts (15–30 min)

- ☐ Read this quest's full plan (20 min) and order/gather week-2 materials NOW — shipping waits for no one
- ☐ Stage the launch: the story props, the commission letter, the wall chart
- ☐ Preview this week's videos/read-alouds (links in the resource table)
- ☐ Set the challenge menu with point values on the wall

The daily shape

Day 1	Tell the story BIG (commission letter, costumes, drama). Set the challenge menu on the wall.
Day 2	First knowledge stations/read-alouds; start the scavenger/discovery challenge.
Day 3	Deepen: the week's key resource (video/book) + narration back.
Day 4	First skills check; learners file their choices (topic, role, medium).
Day 5 / close	Review goals aloud; approve choices; tease week 2.

Socratic launches · and what to watch for

- ? What would make this quest worth five weeks of your life?
- ? What does an expert in this field know that we don't — yet?
- ? Hero or victim: how does each start a hard new thing?

-
- ! A learner with no choice filed by Friday — choose WITH them, never FOR them
-
- ! Guides over-explaining: if you answered the same question twice, build a resource instead
-

Resources in play this week

Week 1 Video	Mark Rober — engineering playlist (CrunchLabs YT) One video per morning launch; the “engineer’s mindset” voice of the quest https://www.youtube.com/@MarkRober
Week 1 Book	David Macaulay, “The Way Things Work Now” The quest’s reference bible — leave it on the table all session https://bookshop.org/search?keywords=David%20Macaulay%2C%20The%20Way%20Things%20Work%20Now
All weeks Faith	St. Joseph the Worker — patron of the quest Open each week: work as imitation of the Creator; a Litany of St. Joseph on Mondays https://www.google.com/search?q=St.%20Joseph%20the%20Worker

Every studio runs this week

Seedling Studio Ages 5–7	Stations and hunts; builds with K’NEX/blocks and pre-cut parts; invention may be “improved” from a model; 30-second show-and-tell demo.
Disciple Studio Ages 8–11	Full toolbox rights (hand tools); CrunchLabs Build Box tie-in; Rube Goldberg team lead roles; writes a one-page “patent application” for the invention.
Apostle Studio Ages 12–14	Adds mechanical advantage math (ratios, torque); Hack Pack motorized elements allowed; CAD sketch (paper or Tinkercad); 2-min demo with a physics explanation.
Missionary Studio Ages 15–18	Leads a build team; costs the invention (bill of materials + labor); pitches it as a product — could it sell at the next Business Fair? Runs judge logistics for the exhibition.



LUMEN

CATHOLIC FAMILY ACADEMY · THE KOLBE FAMILY

Gears & Machines: The Inventor's Workshop

W2 · Toolbox Rights · Guide's Weekly Brief · Stage: Skills & Tools · Session 1 of 7 · 2026–27

The arc of this week. Drill week: the component skills, tools, and techniques the challenge will demand. Gates are real — a skipped safety check or skill gate now becomes a week-4 disaster.

This quest, this week: Real tools, real safety: measure, cut, drill, sand, fasten (by studio level). Each learner passes a tool-safety check to earn “toolbox rights.” Build the classic challenges: catapult (lever), zip-line pulley rescue, marble run.

Your role: Guide teaches ONE tool per day, then supervises without hovering. The safety check is a real gate — no rights, no build week.

Before the week starts (15–30 min)

- ☐ Learn this week's key skill YOURSELF first (one evening) — you can't gate what you can't do
- ☐ Set up stations/labs the night before (15 min each)
- ☐ Print or draw the skills-gate checklist per learner
- ☐ Confirm week-3 materials are in hand

The daily shape

Day 1	Demonstrate the first skill ONCE, well; then reps.
Day 2	Second skill + retrieval check on week-1 knowledge (closed book!).
Day 3	Third skill; slower learners get more reps, not more lecture.
Day 4	The GATE: skills check each learner must pass (tool rights, technique, drill).
Day 5 / close	Celebrate gates passed; assign catch-up reps where needed.

Socratic launches · and what to watch for

- ? Why do masters practice things they're already good at?
- ? What's the difference between “I watched it” and “I can do it”?
- ? Where does this skill show up in an adult's real life?

! A learner who “watched the video” but can’t do the thing — retrieval beats recognition

! Safety shortcuts: the gate is a gate. No pass, no build week

Resources in play this week

Week 2	CrunchLabs Build Box (current month)
Kit	W2 build challenge; Hack Pack for Apostle+ https://www.crunchlabs.com

Week 2	“Woodworking for Mere Mortals” (Steve Ramsey, YT) — tool basics
Video	Tool-safety week: one short video before each new tool https://www.youtube.com/@SteveRamsey

All weeks	St. Joseph the Worker — patron of the quest
Faith	Open each week: work as imitation of the Creator; a Litany of St. Joseph on Mondays https://www.google.com/search?q=St.%20Joseph%20the%20Worker

Every studio runs this week

Seedling Studio	Stations and hunts; builds with K’NEX/blocks and pre-cut parts; invention may be “improved” from a model; 30-second show-and-tell demo.
------------------------	---

Disciple Studio	Full toolbox rights (hand tools); CrunchLabs Build Box tie-in; Rube Goldberg team lead roles; writes a one-page “patent application” for the invention.
------------------------	---

Apostle Studio	Adds mechanical advantage math (ratios, torque); Hack Pack motorized elements allowed; CAD sketch (paper or Tinkercad); 2-min demo with a physics explanation.
-----------------------	--

Missionary Studio	Leads a build team; costs the invention (bill of materials + labor); pitches it as a product — could it sell at the next Business Fair? Runs judge logistics for the exhibition.
--------------------------	--



LUMEN

CATHOLIC FAMILY ACADEMY · THE KOLBE FAMILY

Gears & Machines: The Inventor's Workshop

W3 · The Rube Goldberg Trials · Guide's Weekly Brief · Stage: The Build (Apply) · Session 1 of 7 · 2026–27

The arc of this week. The heart of the quest: knowledge becomes necessary. Learners apply everything on the real challenge — and hit real obstacles. Your restraint this week determines what they learn.

This quest, this week: Teams build a Rube Goldberg machine using at least 4 simple machines and 8 steps. Iterate daily; document failures in the build log. Physics vocabulary (force, work, mechanical advantage) drilled through the build.

Your role: Guide's only job: enforce the build log (photo + one sentence per attempt) and run the afternoon Socratic: "What failed? What did the failure teach you?"

Before the week starts (15–30 min)

- ☐ Protect the block on the calendar — this week dies by a thousand errands
- ☐ Stage materials for instant starts (bins beat cabinets)
- ☐ Line up the week-4 critiquer (grandparent, expert, pastor) TODAY
- ☐ Review each learner's milestone — know who's behind before Friday

The daily shape

Day 1	Launch the main challenge; teams/roles finalize; first attempt TODAY (bias to action).
Day 2	Iterate; enforce the build/lab log (photo + one sentence per attempt).
Day 3	Mid-build Socratic: what has failure taught so far?
Day 4	Push to a complete (ugly) first version — done is the goal, not pretty.
Day 5 / close	First versions reviewed against milestones; log gaps honestly.

Socratic launches · and what to watch for

- ? What did your best failure this week teach you?
- ? Where did the plan meet reality — and what did reality say?
- ? What would [the quest's expert/patron] do at this obstacle?

! Perfectionists polishing detail A while the whole is unbuilt — “ugly and complete beats pretty and partial”

! The Guide’s hands on the work: if your fingerprints are on it, it isn’t theirs

Resources in play this week

Week 3	Joseph’s Machines (YT) — Rube Goldberg inspiration
---------------	---

Video

Monday W3 launch: watch, then storyboard your own

<https://www.youtube.com/@JosephsMachines>

Week 3	Khan Academy — work & energy intro (Apostle+)
---------------	--

Site

Core-skills crossover during W3–W4

<https://www.khanacademy.org>

All weeks	St. Joseph the Worker — patron of the quest
------------------	--

Faith

Open each week: work as imitation of the Creator; a Litany of St. Joseph on Mondays

<https://www.google.com/search?q=St.%20Joseph%20the%20Worker>

Every studio runs this week

Seedling Studio	Stations and hunts; builds with K’NEX/blocks and pre-cut parts; invention may be “improved” from a model; 30-second show-and-tell demo.
------------------------	---

Ages 5–7

Disciple Studio	Full toolbox rights (hand tools); CrunchLabs Build Box tie-in; Rube Goldberg team lead roles; writes a one-page “patent application” for the invention.
------------------------	---

Ages 8–11

Apostle Studio	Adds mechanical advantage math (ratios, torque); Hack Pack motorized elements allowed; CAD sketch (paper or Tinkercad); 2-min demo with a physics explanation.
-----------------------	--

Ages 12–14

Missionary Studio	Leads a build team; costs the invention (bill of materials + labor); pitches it as a product — could it sell at the next Business Fair? Runs judge logistics for the exhibition.
--------------------------	--

Ages 15–18



LUMEN

CATHOLIC FAMILY ACADEMY · THE KOLBE FAMILY

Gears & Machines: The Inventor's Workshop

W4 · The Client Problem · Guide's Weekly Brief · Stage: Critique & Revise · Session 1 of 7 · 2026–27

The arc of this week. Where growth lives. Warm/cool critique, then real revision — the second draft is the lesson. Also: exhibition logistics start now, run by learners.

This quest, this week: Each learner interviews a family member about a chore that's hard, then designs an original machine to lighten it. Sketch → prototype → critique circle → revise (the heart of the quest).

Your role: Guide schedules the critique circle Thursday: warm feedback, cool feedback, one change to make. Hold the line on REVISION — the second draft is the lesson.

Before the week starts (15–30 min)

- ☐ Brief your outside critiquer: the protocol, the rubric, 30 minutes
- ☐ Print draft-vs-draft comparison sheets
- ☐ Learners send invitations THIS week (guest list per the quest's exhibition spec)
- ☐ Book/confirm the exhibition venue and time

The daily shape

Day 1	Critique protocol taught/refreshed: kind, specific, helpful; warm then cool.
Day 2	CRITIQUE CIRCLE with the outside guest; every learner logs one change to make.
Day 3	Revision day one: the logged change gets made (no new features!).
Day 4	Revision day two + exhibition prep begins (invitations out, roles assigned).
Day 5 / close	Drafts one and two side by side; the difference IS the grade.

Socratic launches · and what to watch for

- ? Why does critique feel dangerous — and when has it made you better?
- ? What's the difference between "I like it" and useful feedback?
- ? Would you rather hear hard truth now or applause for weak work later?

! Critique that wounds (enforce the protocol) or flatters (enforce the cool half)

! Revision skipped “because time” — cut scope, never the revision

Resources in play this week

Week 4	Smarter Every Day — engineering deep-dives (YT)
---------------	--

Video

Pick one per studio level for the client-problem week

<https://www.youtube.com/@smartereveryday>

All weeks	St. Joseph the Worker — patron of the quest
------------------	--

Faith

Open each week: work as imitation of the Creator; a Litany of St. Joseph on Mondays

<https://www.google.com/search?q=St.%20Joseph%20the%20Worker>

Every studio runs this week

Seedling Studio	Stations and hunts; builds with K'NEX/blocks and pre-cut parts; invention may be “improved” from a model; 30-second show-and-tell demo.
------------------------	---

Ages 5–7

Disciple Studio	Full toolbox rights (hand tools); CrunchLabs Build Box tie-in; Rube Goldberg team lead roles; writes a one-page “patent application” for the invention.
------------------------	---

Ages 8–11

Apostle Studio	Adds mechanical advantage math (ratios, torque); Hack Pack motorized elements allowed; CAD sketch (paper or Tinkercad); 2-min demo with a physics explanation.
-----------------------	--

Ages 12–14

Missionary Studio	Leads a build team; costs the invention (bill of materials + labor); pitches it as a product — could it sell at the next Business Fair? Runs judge logistics for the exhibition.
--------------------------	--

Ages 15–18

Ad Majorem Dei Gloriam · LUMEN Catholic Family Academy



LUMEN

CATHOLIC FAMILY ACADEMY · THE KOLBE FAMILY

Gears & Machines: The Inventor's Workshop

W5 · Polish & the Convention · Guide's Weekly Brief · Stage: Polish & Exhibition · Session 1 of 7 · 2026–27

The arc of this week. Rehearse, polish, and go public. The exhibition is the exam, the celebration, and the proof — learners run everything including setup and teardown. You sit in the audience.

This quest, this week: Final builds, demo speeches rehearsed (30–60s per studio level), signage and invitation made by learners. Final Friday: Invention Convention exhibition with judges' Q&A.

Your role: Guide invites 3+ non-parent adults as judges, prints the rubric, then sits in the audience. Learners run the show — including setup and teardown.

Before the week starts (15–30 min)

- ☐ Confirm guests/judges (3+ non-parent adults raises the stakes beautifully)
- ☐ Print rubrics/programs the learners designed
- ☐ Charge cameras — the portfolio needs this
- ☐ Plan the after-party: heroes feast

The daily shape

Day 1	Final builds locked (feature freeze); demo speeches drafted.
Day 2	Rehearsal one: full run, brutal clock, notes taken by learners.
Day 3	Fix list from rehearsal; signage/programs/hospitality produced.
Day 4	Dress rehearsal for a home audience; final polish.
EXHIBITION DAY	learners run the show. You: chairs, water, applause, tears.

Socratic launches · and what to watch for

- ? What do you want the audience to KNOW, FEEL, and ASK?
- ? What will you say when someone asks about the part that failed?
- ? Who are you performing for, really? (The honest answer orders everything)

! The Guide taking over logistics under pressure — hand it back, every time

! Post-exhibition deflation: schedule the debrief AND the celebration

Resources in play this week

Week 5	Visit a maker space, machine shop, or grandpa's garage
---------------	---

Field

Friday W4 or W5 — see real machinists at work

<https://www.google.com/maps/search/Visit%20a%20maker%20space%2C%20machine%20shop%2C%20or%20grandpa%E2%80%99s%20garage>

All weeks	St. Joseph the Worker — patron of the quest
------------------	--

Faith

Open each week: work as imitation of the Creator; a Litany of St. Joseph on Mondays

<https://www.google.com/search?q=St.%20Joseph%20the%20Worker>

Every studio runs this week

Seedling Studio	Stations and hunts; builds with K'NEX/blocks and pre-cut parts; invention may be "improved" from a model; 30-second show-and-tell demo.
------------------------	---

Ages 5–7

Disciple Studio	Full toolbox rights (hand tools); CrunchLabs Build Box tie-in; Rube Goldberg team lead roles; writes a one-page "patent application" for the invention.
------------------------	---

Ages 8–11

Apostle Studio	Adds mechanical advantage math (ratios, torque); Hack Pack motorized elements allowed; CAD sketch (paper or Tinkercad); 2-min demo with a physics explanation.
-----------------------	--

Ages 12–14

Missionary Studio	Leads a build team; costs the invention (bill of materials + labor); pitches it as a product — could it sell at the next Business Fair? Runs judge logistics for the exhibition.
--------------------------	--

Ages 15–18



LUMEN

CATHOLIC FAMILY ACADEMY · THE KOLBE FAMILY

The Daily Rhythm & Prayers

Schedule A (7:30 – 1:30) — adjust to your family's chosen schedule

7:30 Morning Offering & Launch

Family prayer (Hallow), saint of the day, SMART goals set by each learner.

8:00 Core Skills Block I

Math (Khan) + Reading (Lexia) — deep work, no interruptions. Guides coach; apps give feedback.

9:30 Movement & Snack

Outside. Bodies made for motion.

9:50 Core Skills Block II

Writing (IEW / Night Zookeeper), catechism, memory work, language (Legentibus).

11:15 Angelus & Lunch Crew

The Angelus prayed; lunch cooked and cleaned by the rostered learner.

12:00 Quest Block

The session quest — 80 focused minutes. Guides ask questions, never lecture.

1:20 Examen & Close

What was I given? Where did I fail? Grace for tomorrow. Done by 1:30.

The Day's Prayers

The Morning Offering

O Jesus, through the Immaculate Heart of Mary, I offer You my prayers, works, joys, and sufferings of this day, for all the intentions of Your Sacred Heart, in union with the Holy Sacrifice of the Mass throughout the world, for the salvation of souls, in reparation for my sins, and for the intentions of our Holy Father. Amen.

The Angelus (noon)

V. The Angel of the Lord declared unto Mary. R. And she conceived of the Holy Spirit. Hail Mary...

V. Behold the handmaid of the Lord. R. Be it done unto me according to thy word. Hail Mary...

V. And the Word was made Flesh. R. And dwelt among us. Hail Mary...

V. Pray for us, O holy Mother of God. R. That we may be made worthy of the promises of Christ. — Let us pray...

The Examen (close) — five steps

1 · Thank You — name one gift aloud 2 · Ask for Light 3 · Look Back over the day 4 · Say Sorry — one honest sorry 5 ·
Tomorrow, with Grace

Ad Majorem Dei Gloriam · LUMEN Catholic Family Academy