

SAINTS GLOBAL

ACTIVITY PLAN

EARTH SCIENCE

INTELLECTUAL CORE

Version 2026.1



Companion to the BRC: a series of one-hour activity sessions for use on weekly activity night or at home. Each session declares which requirements it contributes to.

THE CULMINATING EVENT

The conservation action

Between Sessions 3 and 4, each saint completes one hands-on conservation or pollution-prevention activity he committed to in the Session 3 close — a week of recycling documentation, a hazardous-waste identification walkthrough at home, a pollination study in a yard or park, or a measured resource-reduction (water or power). He records evidence — counts, photos, a one-page log — and brings it to Session 4 as the proof Step 3b is earned.

OFF-MEETING — THE SAINT'S HOME, NEIGHBORHOOD, OR AN APPROVED LOCAL SITE

4 SESSIONS IN THIS PLAN

SESSION 1 · INTELLECTUAL CORE

⌚ 60 min target

Define the work and observe the field

Environmental science is the practice of looking carefully and reporting honestly.

SESSION AIM

Run Step 1 end to end — what environmental science is, the difference between opinion and observation, and a working two-day plan for the ecosystem each saint will observe before Session 2. Saints leave with 1a marked, the ecosystem and dates locked, and an observation card to carry into the field.

🎯 WALK AWAY WITH

- Can explain environmental science as observation, evidence, and informed action in his own words
- Has chosen an approved ecosystem and two observation dates before Session 2
- Has the ecosystem observation card and knows how to use each section
- Can tell the difference between an opinion sentence and an observation sentence

📦 BRING / SET UP

- A short whiteboard prompt area for the opinion-vs-observation sort
- Printed observation field cards (one per saint — see the Session 1 handout)
- A 30-yard outdoor area the group can walk for the on-site practice (church grounds, parking-lot edge, a park strip)
- A list of three or four approved local ecosystems (yard, vacant lot, park, creek bank, garden) for the saint to pick from
- A calendar or shared sheet for locking each saint's two observation dates
- BRC printouts and pens

🕒 THE HOUR**BLOCK 1 · DISCUSSION Opener — One thing you noticed outside**

⌚ 5 min

Ask the group: "Name one specific thing you noticed outside this week — a plant, an animal, a smell, a change in the air, anything." Take four or five answers around the room. Insist on specificity: not "the weather," but "the grass behind the shed was crunchy and yellow." The point is to put real observation on the table before talking about science.

SESSION 1 · DEFINE THE WORK AND OBSERVE THE FIELD (PAGE 2 OF 3)

THE HOUR — CONTINUED

BLOCK 2 · SKILL PRACTICE **Sort opinion from observation**

⌚ 14 min

1. On the board write two columns: OBSERVATION and OPINION. Read aloud eight short sentences — some grounded ("three brown leaves on the maple"), some abstract ("the air feels worse than it used to"). The group sorts each into a column.
2. Each youth writes two of his own — one of each kind — about the spot just outside the meeting room. Read four or five aloud and sort them with the group.
3. Name the rule: environmental science is built on observations that another saint could repeat. Opinions belong in the discussion that follows, not in the data.
4. Each youth states what environmental science is in his own words — one sentence, plain language, no buzzwords. Capture two or three on the board as the working definition for the badge.

REQ 1A

BLOCK 3 · SKILL PRACTICE **Walk the test plot**

⌚ 18 min

1. Walk the group to a 30-yard outdoor strip near the meeting space. Stand together at the start point for thirty seconds of silence — no talking, just looking and listening.
2. Each youth names one living, one nonliving, and one formerly-living thing he can see or touch from where he stands. Say them aloud around the group; no repeats.
3. Walk the strip slowly. Each youth notes one interaction (a bee on a flower, ants on a fallen branch, a tree root cracking the curb) and one human-caused change (litter, mowing, paving, plantings, a fence).
4. Group up at the far end. Each youth gives one observation in the form "I saw X doing Y, which suggests Z." Sharpen any "Z" that drifts into opinion.
5. Walk back. As you walk, point out a native plant and an invasive or planted one if you can — name them. The saint who wrote the native down circles it on his card.

REQ 1A

SESSION 1 · DEFINE THE WORK AND OBSERVE THE FIELD (PAGE 3 OF 3)

☰ THE HOUR — CONTINUED

BLOCK 4 · CREATIVE **Lock the two-day ecosystem observation**

🕒 18 min

1. Hand out the ecosystem observation card. Walk the four sections aloud: living, nonliving, formerly living, interactions and human impact.
2. Each youth picks his ecosystem from the approved list — backyard, neighborhood park, a creek bank, a community garden, a wooded lot. Smaller and closer to home beats larger and harder to reach.
3. Each youth picks two observation dates before Session 2 and writes them on the card and the shared calendar. The two visits should be at least one day apart and one of them ideally a different time of day.
4. On the back of the card, each youth writes one specific thing he expects to see and one question he is going in with. Both will be tested on the visit.
5. Pair up. Each pair reads the other's plan aloud and challenges any line that is too vague to act on. Rewrite anything that fails the challenge.

REQ 1B

BLOCK 5 · REFLECTION **Close — Step 1 marked, observation locked**

🕒 5 min

1. Hold up the field card. Confirm every saint has his ecosystem chosen, two dates written, and the card in his pocket or folder.
2. Read the working definition of environmental science off the board one more time. Each saint can recite it in his own words on the way out.

🗨 AT THE CLOSE · DEBRIEF

1. Which of your test-plot observations was closest to opinion, and how would you rewrite it?
2. What ecosystem did you choose, and what is one thing you expect to see on the first visit?
3. Which dates are on your card, and what would stop you from getting there?

📝 *Initial 1a on each saint's BRC after this session. 1b is launched as the off-meeting two-day observation and will be marked at the start of Session 2 once the saint presents his completed field card.*

SESSION 2 · INTELLECTUAL CORE

⌚ 60 min target

Investigate water and air locally

Read the real reports for the place where the saint actually lives.

SESSION AIM

Open with the field-card report from each saint's two-day ecosystem observation, then move into the local water and air work. Saints walk a real community water quality report and pick one air pollution question — transportation modes compared, or the Clean Air Act and its measured outcomes. Saints leave with 1b verified, 2a and 2b marked, and a clear picture of how their own community handles water and air.

🎯 WALK AWAY WITH

- Has reported on his two-day ecosystem observation with specific living, nonliving, and human-impact entries
- Can name his local water source, one treatment step, and one substance the latest CCR reports on
- Can explain one air pollution tradeoff with a concrete example from transportation modes or Clean Air Act outcomes
- Has 1b verified on the field card and 2a and 2b marked on the BRC

📦 BRING / SET UP

- Each saint's completed ecosystem observation card from the homework
- Printed copies of the local Consumer Confidence Report (CCR) or municipal water-quality summary, one per pair
- Printed copies of the water-report walkthrough handout (see this session)
- A short reference printout on transportation emissions per passenger-mile (car, bus, bike, walking) OR a short Clean Air Act timeline with three measured pollutant trends — pick one ahead of time
- BRC printouts and pens

🕒 THE HOUR**BLOCK 1 · DISCUSSION Opener — The field report**

⌚ 5 min

Go around the room. Each saint holds up his field card and gives a 30-second report: ecosystem chosen, the two dates, one thing he expected and saw, one thing he did not expect, and the strongest human-caused change he noticed. Listen for specifics; sharpen anything vague before moving on.

SESSION 2 · INVESTIGATE WATER AND AIR LOCALLY (PAGE 2 OF 3)

THE HOUR — CONTINUED

BLOCK 2 · SKILL PRACTICE **Walk the water-quality report**

⌚ 18 min

1. Each pair gets the local CCR and the walkthrough handout. Read aloud the source line — where the community's water actually comes from (a named river, lake, reservoir, well field, or aquifer). Each saint writes the source on his BRC notes.
2. On the CCR, find the treatment summary. Name the steps in order: typically intake screening, coagulation, settling, filtration, and disinfection. Each youth writes one sentence on what each step removes or kills.
3. Find the regulated contaminants table. Pick three: one inorganic (lead, copper, nitrate), one disinfection byproduct, and one microbiological indicator. For each, name the detected level, the action level, and what the contaminant is.
4. Discuss why standards exist at all. The action level is the trigger that forces treatment changes; the maximum contaminant level is the legal ceiling. Both came from long-term health studies on exposure.
5. Each youth states, in one sentence, where his water comes from and one thing the latest report shows about it. The sentence should be specific enough that another saint could check it.

REQ 2A

BLOCK 3 · CREATIVE **Compare an air pollution choice or policy**

⌚ 22 min

1. Pick one path for the group ahead of time. Path A: compare transportation modes. Path B: walk the Clean Air Act and its measured outcomes. Do not run both — pick the one your group will think harder about.
2. Path A: Hand out the emissions-per-passenger-mile sheet. Each youth ranks four modes (single-occupancy car, full bus, bike, walking) and names which everyday trip he could shift from one mode to another. Pair up to challenge each other's pick on whether the shift is realistic.
3. Path A continued: Each youth names one tradeoff — time, cost, weather, distance, who else is in the car. The pollution cost is one variable; the others are real. Capture the full tradeoff in a single sentence.
4. Path B: Walk the Clean Air Act timeline. Pick three pollutants the EPA tracks (lead, sulfur dioxide, particulate matter). Each youth writes the trend since 1970 in one sentence and one likely cause of the trend.
5. Path B continued: Each youth names one cost the regulation imposed — refinery upgrades, vehicle changes, electricity price effects — and one outcome it produced. Both sides exist; the saint should be able to argue either.
6. Around the room, each youth gives one balanced sentence about air pollution: a benefit, a cost, and the evidence behind it.

REQ 2B

SESSION 2 · INVESTIGATE WATER AND AIR LOCALLY (PAGE 3 OF 3)

THE HOUR — CONTINUED

BLOCK 4 · CREATIVE Write the water-and-air brief

⌚ 10 min

1. On a single half-sheet, each youth writes two paragraphs. Paragraph one: the local water source, one treatment step, one detected contaminant, and what the report says about it. Paragraph two: one balanced sentence on the air pollution question from Block 3 and one tradeoff he can name.
2. Pair up. Each pair reads the other's brief aloud. Mark any sentence where the evidence is missing — a number, a source, a specific place — and rewrite it.
3. Each youth folds the brief into his BRC packet. It is the artifact 2a and 2b leave behind.

REQ 2A

REQ 2B

BLOCK 5 · REFLECTION Close — Step 2 marked, field card filed

⌚ 5 min

1. Confirm every saint has his water source written down and his air pollution sentence ready to repeat.
2. Collect or photograph each saint's field card before he leaves — that is the evidence record for 1b.

AT THE CLOSE · DEBRIEF

1. Which contaminant on your water report was the one you had never heard of, and what would you ask the utility about it?
2. Which trip in your week could you actually move to a different mode, and what would stop you?
3. What did you cross out on your field card between the first and second visit, and why?

☑ Initial 1b after the field-card report in Block 1, and 2a and 2b after Blocks 2 and 3. Note any saint whose field card was incomplete and give him a make-up date before Session 3.

SESSION 3 · INTELLECTUAL CORE

⌚ 60 min target

Act on three pieces of Step 3

Build the species report, the invasives comparison, and the air experiment that prove Step 3.

SESSION AIM

Run three of the five Step 3 pieces in-session — species report draft, invasive species comparison, and the particulate matter experiment. Close the hour by committing each saint to his off-meeting conservation action (3b), which becomes the field test the badge converges on. Saints leave with 3a, 3c, and 3d marked, and 3b dated and chosen.

🎯 WALK AWAY WITH

- Has a 100-word draft and a chosen illustration for his rare, threatened, or recovered species report
- Can name two local invasive species, where each came from, and one control method per species
- Has run the particulate matter collection experiment, recorded counts, and explained one source and one limit
- Has chosen his conservation action option and put the off-meeting work on the calendar before Session 4

📦 BRING / SET UP

- Internet access or printed wildlife-source packets (state fish and wildlife or USFWS species fact sheets) for the species report block
- A short list of two or three local invasive species with origin, spread, impact, and control method (one source sheet per saint)
- Particulate-matter collection setup: index cards smeared lightly with petroleum jelly, masking tape, and a magnifier or phone camera with macro mode (one set per pair)
- A clipboard sign-up sheet for the four 3b conservation action options
- BRC printouts and pens

🕒 THE HOUR**BLOCK 1 · DISCUSSION Opener — Three to finish tonight**

⌚ 5 min

Lay out the hour: three Step 3 pieces in-session (species report draft, invasives comparison, particulate experiment) and one piece committed for off-meeting before Session 4. Read the four conservation action options aloud so the saint hears them once before the close. The pace is real — the writing block ends when the timer ends.

SESSION 3 · ACT ON THREE PIECES OF STEP 3 (PAGE 2 OF 3)

THE HOUR — CONTINUED

BLOCK 2 · CREATIVE **Draft the species report**

⌚ 22 min

1. Each youth picks one rare, threatened, or recovered species from the wildlife-source packet. A state-level or local species reads better than a famous one nobody can visit.
2. Read the source on the species for five minutes. Underline the habitat, the status (threatened, endangered, delisted), one cause of decline, and one conservation action that helped or is helping.
3. Write the 100-word report. The shape: one sentence on what the species is and where it lives, two sentences on the status and cause, one sentence on the conservation action, one sentence on why it matters.
4. Pick the illustration: a drawing or a printed photo. If a drawing, sketch it now on the back of the report; if a photo, label it with species, location, and date the photo was taken.
5. Pair up. Each pair reads the other's report aloud, marks anything vague, and confirms the four facts are present. Rewrite anything that fails the check.

BY TIER

ENTRY

Pick a species the source sheet covers fully — write the report to the structure as given.

ESTABLISHED

Pick a species the source sheet only sketches; add one fact you have to find yourself from a credible source.

MENTOR

Pick a contested or delisted species (gray wolf, bald eagle, brown pelican); name one part of the recovery that is still debated and where the disagreement comes from.

REQ 3A

BLOCK 3 · SKILL PRACTICE **Compare two local invasives**

⌚ 15 min

1. Hand out the invasive species source sheet. Each youth picks two from the list — one plant, one animal or insect if possible.
2. For each, write four lines: origin (the place it came from), spread (how it arrived and how it travels), impact (what it displaces or damages), and control (one method that works, and one that does not).
3. Each youth names one place near home where the invasive is visible. If he cannot name one, the leader points to one within walking or driving distance.
4. Around the room, each youth gives a one-sentence summary on each of his two: what it is, where it came from, and what it costs the local ecosystem.
5. Name the prevention rule: most invasives are easier to stop at the boundary than to remove once established. Clean boots, clean boats, don't move firewood.

REQ 3C

SESSION 3 · ACT ON THREE PIECES OF STEP 3 (PAGE 3 OF 3)

THE HOUR — CONTINUED

BLOCK 4 · PHYSICAL **Run the particulate matter experiment**

⌚ 13 min

1. Hand each pair an index card with a thin film of petroleum jelly on one side. The card is the collector — it catches what falls out of the air.
2. Each pair places one card outdoors at the meeting site at a measured location: near a road, under a tree, on a sheltered windowsill. Tape it in place, sticky side up, and start the timer.
3. Use the wait time to discuss sources: combustion engines, cooking, construction dust, pollen, wildfire smoke. Each youth names one likely source for tonight's site and one season when that source would change.
4. After ten minutes, retrieve the cards. Each pair uses the magnifier or phone macro to count the particles in a measured square (1cm x 1cm). Record the count and a one-line description (dark, light, varied).
5. Each youth states one limit of the experiment: short collection time, untrained eye, no size sorting, no chemical identification. Real PM monitors solve these — name what each limit costs the conclusion.

REQ 3D

BLOCK 5 · REFLECTION **Close — Pick your 3b and lock the date**

⌚ 5 min

1. Read the four 3b options one more time: a one-week recycling documentation, a hazardous waste identification walkthrough at home, a pollination study in a yard or park, or a measured resource-reduction in water or power.
2. Each saint picks his option and writes the start and end dates on the sign-up sheet and on his BRC. The end date must be before Session 4.
3. Each saint names what evidence he will bring to Session 4 — counts, photos, a one-page log. The leader confirms the evidence plan is enough to prove the work.

AT THE CLOSE · DEBRIEF

1. Which of your four species-report facts was the hardest to nail down, and what source finally answered it?
 2. Which of your two invasives is the one most people in your neighborhood would not recognize, and how does that help it spread?
 3. What did your PM card actually show, and what would you change about the experiment if you ran it again?
- ☒ Initial 3a, 3c, and 3d on each saint's BRC after this session. Record each saint's chosen 3b option and end date on the trek log; the 3b mark waits until Session 4 when the evidence is presented.

SESSION 4 · INTELLECTUAL CORE

⌚ 60 min target

Report the action and finish the badge

Bring the conservation action evidence, evaluate one real project, and sign off the BRC.

SESSION AIM

Saints arrive having finished the off-meeting conservation action. The session opens with a five-minute report from each saint and the 3b mark, then runs the environmental impact evaluation (3e) on a real or composed proposed project, then careers (4a), then a full BRC walk-through. Saints leave with a fully signed BRC and one stewardship habit they plan to keep.

🎯 WALK AWAY WITH

- Has reported on his conservation action with evidence and one specific change he saw
- Has evaluated a proposed construction project with a no-action alternative and at least three impact categories
- Has named three environmental and earth science careers and explained the training for one in detail
- Has a signed BRC and one stewardship habit he plans to keep past the badge

📦 BRING / SET UP

- Each saint's conservation action evidence (logs, photos, counts) from the off-meeting work
- A one-page summary of a proposed construction project for the impact evaluation — a real local proposal if possible, or a composed example (a new road through a wetland, a parking lot expansion across a creek, a wind farm on a ridge)
- An environmental impact evaluation worksheet: project purpose, three impact categories, mitigation, no-action alternative
- A short careers handout listing field, laboratory, regulatory, and policy roles with example titles
- BRC printouts and pens

🕒 THE HOUR**BLOCK 1 · DISCUSSION Opener — The conservation action report**

⌚ 10 min

Each saint gives a one-minute report: option chosen, what he actually did, the evidence he is holding up, one specific change he saw, and one improvement he would make next time. Hold the floor briefly — the report is the proof, not a presentation. Mark 3b on each BRC as the report is given.

SESSION 4 · REPORT THE ACTION AND FINISH THE BADGE (PAGE 2 OF 3)

THE HOUR — CONTINUED

BLOCK 2 · CREATIVE Evaluate the proposed project

⌚ 20 min

1. Hand each pair the project summary. Read it aloud once. Name the stated purpose in one sentence.
2. On the worksheet, each pair lists three impact categories the project would change — air, water, soil, wildlife, traffic, noise, light, view. Pick the three most relevant to the project.
3. For each category, write the likely impact in one sentence ("more turbid runoff into the creek for two seasons during construction") and one mitigation that has been used on similar projects ("silt fencing along the creek edge").
4. Write the no-action alternative: what happens if the project is not built? Name a real cost (traffic stays the same, the wetland stays intact, the housing demand stays unmet).
5. Each pair gives a 60-second verdict: built as proposed, built with named mitigation, or not built. The verdict is the saint's; the leader does not vote.
6. Name the rule: environmental impact evaluation does not produce a single right answer. It produces a structured argument the saint can defend.

REQ 3E

BLOCK 3 · DISCUSSION Three careers and one path

⌚ 17 min

1. Hand out the careers sheet. Read aloud the four lanes: field (wildlife biologist, hydrologist, field geologist), laboratory (environmental chemist, ecotoxicologist), regulatory (EPA inspector, state environmental engineer), and policy (environmental lawyer, conservation officer).
2. Each youth picks three careers — at least two lanes between them. He writes the title and the lane.
3. Each youth picks one of his three and goes deeper: the training path (degree, certifications, internships), one entry-level job he could realistically reach by 25, and one specific employer in his state or region.
4. Around the room, each youth gives a 30-second career sketch on his deep-dive choice. The leader presses on the training step — degree first, or apprenticeship first? Field hours required? A licensing exam?
5. Name the takeaway: environmental and earth science careers serve communities directly, and the training for them is concrete and reachable.

REQ 4A

BLOCK 4 · DISCUSSION BRC walk-through

⌚ 6 min

1. Walk every line of the BRC together. The leader reads each step number aloud; each saint confirms it is marked or names what is missing.
2. Anything still open gets a dated deadline written on the BRC. The saint commits to the date and the evidence he will bring.

SESSION 4 · REPORT THE ACTION AND FINISH THE BADGE (PAGE 3 OF 3)

THE HOUR — CONTINUED

BLOCK 5 · REFLECTION **Close — BRC sign-off**

⌚ 7 min

1. Each saint names one stewardship habit from the badge he plans to keep — the field card on a walk, the CCR check once a year, the recycling discipline, the route-choice habit.
2. Sign the BRC where complete. Anything outstanding has a deadline; the saint leaves knowing what he still owes.

AT THE CLOSE · DEBRIEF

1. What did the evidence from your conservation action show that you did not expect when you picked the option?
2. Whose impact evaluation verdict surprised you, and which category drove it?
3. Which of the three careers did you cross off your list during the session, and why?

📝 *Initial 3b after the conservation action report, 3e after the project evaluation, and 4a after the careers block. With 1a through 3d already marked, the BRC should fully sign off tonight. Any remaining item gets a dated deadline written on the BRC.*

HANDOUT 1 OF 2

FROM SESSION 1 — LOCK THE TWO-DAY ECOSYSTEM OBSERVATION

Ecosystem Observation Field Card

Print one per saint. Walk the four sections in Session 1, then carry it on both observation visits before Session 2.

EARTH SCIENCE · FIELD CARD

Write down what you can point at.

Two visits, at least one day apart, same ecosystem. Specifics beat general impressions.

VISIT 1	VISIT 2	ECOSYSTEM
date · time · weather	date · time · weather	name and exact location

1 LIVING

plants, animals, insects you can name

Write what; if you don't know the name, write "unknown" plus a one-line description.

2 NONLIVING

soil, water, rock, air, light, weather

3 FORMERLY LIVING

dead leaves, fallen wood, bones, shells

4 INTERACTIONS & HUMAN IMPACT

<p>Write what you can point at. If you cannot point at it, write the question instead.</p>	<p>NOTATION</p> <p>A → B A acts on B</p> <p>A → H human changed A</p> <p>Mark every line that names a human-caused change.</p>
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Print this handout for in-person reference during session 1 — lock the two-day ecosystem observation.

HANDOUT 2 OF 2

FROM SESSION 2 — WALK THE WATER-QUALITY REPORT

Reading a Water Quality Report

Print one per pair. Use it as the map for finding the four pieces of any Consumer Confidence Report.

EARTH SCIENCE · FIELD CARD

Read the report your utility prints.

Every utility publishes a Consumer Confidence Report each year. Four pieces tell you what you need.

1 SOURCE

named river, lake, well field, or aquifer

Find the line that names where your community's drinking water actually comes from. It will name a surface source (a river or lake) or a groundwater source (a well field or aquifer). Write it on your BRC notes.

_____ your source

2 TREATMENT TRAIN

five stages, in order



Find the section of the report that names which stages your plant uses. Surface-water plants usually run all five; groundwater plants often skip the coagulation and settling stages because the water is already clean.

3 CONTAMINANTS TABLE

three columns to read

SUBSTANCE	DETECTED	ACTION LEVEL	LEGAL MAX (MCL)
Lead	2 ppb	15 ppb	15 ppb (treatment)

DETECTED is what the utility measured this year, in parts per billion or milligrams per liter. Lower is better.

ACTION LEVEL is the threshold that forces the utility to change treatment or notify the public. A value above this number is a problem.

LEGAL MAX (MCL) is the federal ceiling for that substance in drinking water. Both came from long-term health studies on exposure.

Pick three contaminants — one inorganic, one disinfection byproduct, one microbiological — and read all three columns for each.

4 VIOLATIONS & NOTES

read this section every time

Every report must list any violations of federal standards in the past year and what the utility did about them. If the section is blank, the water met the standards. If it is not blank, read carefully.

Write the source, one treatment step, and one detected contaminant in your own notes.

Print this handout for in-person reference during session 2 — walk the water-quality report.