2026–2027 AIR-FAIR Research Question List

When applying for AIR-FAIR and selecting your team's research question, consider what air quality data you will use and whether your project requires any on-site PurpleAir sensors. Each participating school may receive a maximum of two PurpleAir sensors. The data provided by the requested on-site PurpleAir sensors must be shared amongst teams at the same school. Any PurpleAir sensors provided by DEQ must be installed on school grounds in locations approved by the team's adult advisor and school faculty, and the locations must access to an electrical outlet and Wi-Fi.

If your team plans to use data from a single on-site PurpleAir sensor and compare it to data from another source (such as a PurpleAir sensor at another location, or a DEQ regulatory air quality monitor), identify the comparison monitor(s) in your team's application form.

If your team has an idea for a new research question not provided in the list below, contact DEQ staff with your question and the reasoning for researching the topic. Your team may also change its research question after submitting the application form. Contact DEQ staff to approve the research question change.

School Transportation

- How do school pick up lines affect $PM_{2.5}$ concentrations?
- How does nearby traffic affect $PM_{2.5}$ concentrations?
- How does car idling affect $PM_{2.5}$ concentrations?
- How does the number of buses during drop off and pick up affect $PM_{2.5}$ concentrations?
- Does the morning school drop off have a larger impact on $PM_{2.5}$ than the afternoon pick up?
- How does school attendance impact $PM_{2.5}$ concentrations?

Weather & Natural Events

- What is the relationship between temperature inversions and $PM_{2.5}$ concentrations?
- How does weather (inversions, wind, dust storms, rain, thunder) affect $PM_{2.5}$ concentrations?
- How do seasonal changes, like pollen, affect $PM_{2.5}$ concentrations?
- Is there a relationship between temperature and $PM_{2.5}$ concentrations?
- Which weather variable (temperature, wind speed, humidity, or precipitation) has the strongest influence on $PM_{2.5}$ concentrations?

Monitoring Comparisons

- How effective are low-cost air quality sensors (PurpleAir sensors) compared to high-cost monitoring stations in monitoring $PM_{2.5}$ concentrations?
- How do PurpleAir sensors compare with DEQ regulatory monitors over a week and when do the greatest differences occur?
- How consistent are $PM_{2.5}$ readings from two PurpleAir sensors placed side-by-side?
- How much does sensor location (height above ground) affect $PM_{2.5}$ measurements?

- How do $PM_{2.5}$ concentrations differ between urban and rural areas?
- How does air quality at our school compare to another school in Idaho?
- How does air quality in Idaho compare to another state?

Time of Day

- At what time of day are $PM_{2.5}$ concentrations highest?
- How does air quality change throughout the day?
- How do weekday $PM_{2.5}$ concentrations compare to weekend concentrations?
- How does nighttime air quality compare to daytime air quality?

Human Activities

- How do lawn mowing and landscaping activities affect $PM_{2.5}$ concentrations?
- How do construction activities affect nearby $PM_{2.5}$ concentrations? (Can only be done if your school has active construction occurring.)
- How do outdoor sporting events affect $PM_{2.5}$ concentrations?