



NAISEF

National American Indian
Science & Engineering Fair



NAISEF 2023 Lesson Kit

If you have questions about the Lesson Kit or general NAISEF inquiries, please contact Rennea Howell at rhowell@aises.org.

Visit our websites to learn more:

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National American Indian
Science & Engineering Fair



Subject: NAISEF Prep

Date:

Topic: STEM career exploration

Lesson # 1

Lesson Focus and Goals:

Assist students in determining their interests in order to find topics that they will be passionate about creating projects around. Students will be learning about career options as well as investigating their own interests.

Materials Needed: 1-1 devices with internet access, notetaking materials—a digital format is encouraged so students can quickly find their key sites upon returning to class for later lessons

Learning Objectives:

Students will narrow down their topic to top 3 in order to help them determine what project they will conduct in the next steps

Structure / Activity:

Students will begin by conducting some career exploration in each of the NAISEF categories—animal/plant sciences, behavioral/social sciences, biomedical/biological sciences, chemistry/physics, engineering, mathematics, computer systems and software, robotics/intelligent machines.

Note—if your students need scaffolding here, generate keywords for each category with them as a class.

Have students write down 1 career from each category that interests them. Once they have all eight, they can narrow down to top three. When they have their top three, they will dive deeper into each of those three. Key information they should have at the end of the activity: job title/job description/salary range/education requirements.

You can build more on financial literacy here by discussing cost of living/living wages in your area, however that is entirely optional.

Assessment:

Students will submit three topics or careers that interested them at the end of the lesson. Under the careers/topics they will put information about education requirements for the careers in that field.



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Subject: NAISEF Prep

Date:

Topic: Figuring out your project

Lesson # 2

Lesson Focus and Goals:

Building off the previous lesson, we are going to guide students in determining what content they want to create their project around.

Materials Needed:

1-1 devices with internet access,
notetaking materials

Learning Objectives:

Students will decide on their project topic
during this lesson

Structure / Activity:

Links for project generators:

<https://www.sciencebuddies.org/science-fair-projects/topic-selection-wizard/background-info>

<http://www.reachoutmichigan.org/funexperiments/quick/quick.html>

https://scienceproject.com/index.asp?gclid=CjwKCAjw5s6WBhA4EiwACGncZf-PdsuixMFvGfkDXInEILM0ygRgc76b-4_f694HdGRoCMFu1PqCKRoCU98QAvD_BwE

<https://www.education.com/science-fair/>

<https://www.supplyme.com/collections/science-fair-projects>

<https://www.dwu.edu/alumni-visitors/sciencefair/project-ideas/science-project-ideas>

<https://www.ulm.edu/sciences/scifairprojectideas.html>

Use these generators to give students a jumping off point. Note-at the fair students are judged for creativity so you will want to personalize any of the default options you find on a generator site.

Assessment:

Students will fill out first 2 bullet points on page 1 of the Research Plan Template. Additionally students should have a document with links to important resources for their bibliography.



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Subject: NAISEF Prep

Date:

Topic: Supply planning/budgeting

Lesson # 3

Lesson Focus and Goals:

Once students have a topic and an experiment idea, you will want to have them figure out what they need to test their project.

Materials Needed:

1-1 devices with internet access, project budget document

Learning Objectives:

Students will decide determine a tentative cost for building their projects

Structure / Activity:

Students will research the materials they would need to build their project (note this can include things like printing costs, if they are using 3d printers-filament cost, posterboards, batteries, etc).

If students are doing an engineering project, discuss types of materials/pros and cons of materials and weigh their costs.

Have them fill out the project budget document as they go, since it asks for links. Students may have to make changes to their budget based on resource availability. If this occurs, have them update the budgets.

Assessment:

Students will submit their project budget to the teacher.



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Date:

Topic: Conducting research

Lesson # 4

Lesson Focus and Goals:

Students will begin their experiments and start collecting data as it becomes available.

Materials Needed:

Notetaking materials for observations about the experiment, 1-1 devices for research

Learning Objectives:

Students will learn about the scientific method/engineering design process through experimentation.

Structure / Activity:

If students are not already familiar with the scientific method of engineering design process, introduce the concept at this point.

Introduction to scientific method sample lessons:

<https://www.lessonplanet.com/article/elementary-science/scientific-method>

For engineering design process lessons:

<https://www.teachengineering.org/populartopics/designprocess>

It may be worth showing students how to use Excel or Google Sheets to create graphs of their data. Otherwise you may have them manually create the graphics they will need for their poster.

Note: As students are gathering information about their topic, make sure they keep a document of all the links they use. A bibliography is required on the posters.

Assessment:

Students will fill out the Research Plan Template as they conduct their experiment. The teacher can do daily check ins to assess progress that impact the overall grade of the project. This can be added to the Display Board Grading Rubric.



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Subject: NAISEF Prep

Date:

Topic: Preparing your poster

Lesson # 5

Lesson Focus and Goals:

After students have conducted their research and have data to use, they are going to need to create a poster board for their presentation.

Materials Needed:

Glue, printer (optional), trifold poster boards, scissors, markers

Learning Objectives:

Students will prepare their poster and understand what information is needed for the science fair

Structure / Activity:

Give students time and materials to put their posters together. You can provide them the rubric and have them check off the different parts as they go.

Assessment: Teacher will use rubric to assess the poster board.



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Topic: Mock Science Fair

Lesson # 6

Lesson Focus and Goals:

Once students receive their grade on their poster board and have an opportunity to make any necessary changes, students will act as judges for one another to provide peer feedback.

Materials Needed:

Student posters, judging rubric printed, clipboards (optional), pens

Learning Objectives:

Students will prepare their poster and understand the judging process and interview strategies

Structure / Activity:

Talk to the students about the components of the rubric. Have them note what categories are weighted the most heavily.

Model for the students how to ask clarifying questions as a judge as well as establish norms for positive, constructive feedback (Glow and Grow model or something similar).

Once students understand guidelines, break them into groups of judges and groups of presenters. Set up posterboards of presenters around the classroom and pass out rubrics to student-judges. Research teams will present their research to 1 or 2 of their peer-judges at a time. Teacher can circulate and interject questions/probe to help students.

Assessment: Teacher will collect rubrics at the end of class period and may keep a participation document for a grade during the presentations.