Review or Project: Student/Teacher Choice

Session Time: One, 50-minute session

DESIRED RESULTS

ESSENTIAL UNDERSTANDINGS

Many elements affect the safe completion of a flight.

Pilots must understand factors that pose risks to a flight, how to avoid or mitigate those risks with proper preflight planning, and how to use available resources to ensure the safe completion of a flight.

ESSENTIAL QUESTIONS

How can I effectively present what I've learned this semester to my peers?

LEARNING GOALS

Students Will Know

- The key information from Units 1–4
- How to communicate information to others

Students Will Be Able To

- *Synthesize* information from Units 1–4. [DOK-L4]
- *Create* scenarios where fellow students need to access information, assess data provided to them, and cite evidence for making decisions. [DOK-L4]

ASSESSMENT EVIDENCE

Warm-up
Students brainstorm topics from the past semester for which they would like to create class review activities.

Formative Assessment
In their small groups, students submit a plan of their review activity for teacher approval.

Summative Assessment
Students present their review activity to the class.

LESSON PREPARATION

MATERIALS/RESOURCES

- Review or Project Presentation
- Review or Project Student Activity

- **Sticky notes**

LESSON SUMMARY

Lesson 1: Review or Project: Student/Teacher Choice

This is an optional lesson that students should complete if time remains in the semester following the completion of Units 1–4. In this lesson, students work in small groups to create a review activity and present it to their classmates.

During the first part of the lesson, students brainstorm a list of aviation topics from the semester that are most important to review. Students jot their ideas on sticky notes, and then work together to categorize all the sticky notes. Students then use these categories to form small groups focused on individual topics (or several related topics) to review. Each group then completes a **Formative Assessment** in which they plan a review activity and class presentation for their topic(s).

During the next part of the lesson, students work in their groups to create their review activities and prepare their presentations.

Finally, for the **Summative Assessment**, groups give their presentations to their classmates.

BACKGROUND

In this semester, students learned about the flying environment in which pilots work and aircraft move. This environment may be divided into two main spaces: the locations where pilots take off and land (i.e., airports), and the atmosphere through which pilots fly. The state of the atmosphere in a specific place and time (e.g., clear, overcast, rainy, snowy) is known as weather.

In Units 1 and 2, students focused on weather. The lessons were structured as follows:

Unit 1: Aviation Weather Theory

- Section A: Why Weather Matters
    - Lesson 1: Introduction to Aviation Weather
- Section B: Understanding the Atmosphere
    - Lesson 1: Makeup of the Atmosphere
    - Lesson 2: Atmospheric Circulation and Winds
    - Lesson 3: Clouds and Precipitation
    - Lesson 4: Air Masses and Fronts
    - Lesson 5: Thunderstorms

Unit 2: Aviation Weather Services

- Section A: Weather Observations and Forecasts
    - Lesson 1: Introduction to Aviation Weather Services
    - Lesson 2: Aviation Weather Observation and Reporting
    - Lesson 3: Aviation Forecasts and Weather Charts
- Section B: Getting Weather Information
    - Lesson 1: Preflight Weather Planning

- Lesson 2: Inflight Weather and Tactical Decision Making

In Unit 1, students learned about the theory behind aviation weather; in Unit 2, they learned about the weather-reporting services available to pilots. Through these two units, students achieved these broad understandings:

- Understanding how weather affects flight is one of the essential skills required of pilots.
- Wind, clouds, precipitation and thunderstorms are the common weather phenomena that have the greatest impact on flight safety.
- Weather is caused by the sun's uneven heating of Earth and the resulting effect on moisture.
- Pilots must know how to use available weather services to help form an understanding of the weather situation and make better flying decisions.

In Unit 3, students turned their attention to airports, which are defined by the FAA as "any area of land or water used or intended for landing or takeoff of aircraft." The unit's eight lessons focused first on how airports are structured and operated, and then on how pilots and airport employees communicate and promote safety, as follows:

Unit 3: Airport Operations

- Section A: Understanding Airports
    - Lesson 1: Introduction to Airports and Airport Data
    - Lesson 2: Airport Markings and Signs
    - Lesson 3: Airport Lighting
    - Lesson 4: Traffic Patterns
    - Lesson 5: Communications
    - Lesson 6: Air Traffic Control
    - Lesson 7: Pilot Communications and the Airport Environment
    - Lesson 8: Airport Safety and Pilot Considerations

Through these eight lessons, students achieved these essential understandings:

- For ease and safety of operations at unfamiliar airports, signage, markings, and lighting are standardized.
- An airport's rules and procedures are published and readily available to pilots.
- Communicating a pilot's intentions is a key element of aviation safety.
- Standardized terminology and phraseology helps to maintain the brevity and clarity of communications.
- Coordinating ATC expectations and pilot intentions is a key element of aviation safety.
- In airspace covered by radar, ATC and pilots have multiple ways to ensure aircraft move safely through the sky.
- Pilots are always required to maintain vigilance outside the aircraft to maintain safe flight.
- The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft (FAR 91.3(a)).

Finally, in Unit 4, students learned how pilots use aeronautical charts to plan safe routes for their flights. They also learned about how the National Airspace System (NAS) is structured to ensure the smooth operation of airports and the safety of pilots and passengers. This content was covered in two lessons:

Unit 4: Introduction to Aeronautical Charts and Airspace

- Section A: Introducing Aeronautical Charts and Airspace
    - Lesson 1: Introduction to Aeronautical Charts
    - Lesson 2: Introduction to the National Airspace System

In addition to the various categories of controlled and uncontrolled airspace, students in Unit 4 learned how airspace is charted (i.e., mapped), in order to achieve these essential understandings:

- Preflight planning is an integral (and regulatory) component of safety for all flights whether they are manned or unmanned.
- While some pilots subscribe to the "big sky theory," there are restrictions in certain areas of the sky, and all pilots are expected to know and understand these limitations.
- The National Airspace System (NAS) encompasses all of the sky above the United States, and there are many rules and regulations governing flight in many parts of the NAS.

MISCONCEPTIONS

Encourage students to review the misconceptions from previous lessons in the semester; this can be a useful way to generate topics to review. Remind students to incorporate any relevant misconceptions into their presentations.

DIFFERENTIATION

To support groups that may be struggling to work together in the **EXPLAIN** and **EXTEND** sections of the lesson plan, provide these students with more structure for how they might best work together. For instance, assign group members roles, such as facilitator, recorder, timekeeper, etc., and provide descriptions of these roles so that students have more specific guidance for how they can participate. You may also want to share tips for how to collaborate with others.

LEARNING PLAN

ENGAGE

Teacher Material: Review or Project Presentation
Student Material: Sticky notes

Slides 1-3: Introduce the topic and learning objectives of the lesson.

Slide 4: Conduct the **Warm-Up**.

Warm-Up

This activity will require sticky notes. Ask students to imagine they have been promoted to the position of Basic Ground Instructor (BGI). As a class, briefly discuss the topics that a BGI should cover when teaching others about aviation; as you list these topics on the board, note which topics students have focused on this semester.

Answers will vary, but students should note topics relevant to weather, airport operations, airspace, and charts.

Explain that in this lesson, students will work in small groups to create review activities for their classmates to use as they prepare for the semester exam. Ask: *Which aviation topics that you have*

studied this semester are most important to review? Working individually, students should take a few minutes to jot their answers on sticky notes: one topic per note. Explain that topics should be specific, not general. For example, "thunderstorms" is a better topic than "weather," and "Class C airspace" is a better topic than "airspace." Encourage each student to identify at least five topics.

[DOK-L1; *recall*]

Teaching Tips

Consider listing on the board all the units, sections, and lessons from the past semester. Students may use this list as a reference as they identify topics they would like to review.

EXPLORE

Teacher Material: Review or Project Presentation

Slide 5: Divide the board into the following categories:

- Weather science
- Weather information gathering
- Airports
- ATC services
- Airspace
- Charts
- Other

Instruct students to place each of their sticky notes in the appropriate category on the board. When they have finished, review the notes in the "Other" category; as a class, determine whether each note can be placed in an existing category or whether a new category should be created for it, then reorganize the board as needed.

Slide 6: Divide the class evenly among the various categories; it's best to allow students to choose their preferred category, but if this results in an imbalance, encourage students to move to an underrepresented category. (There should be at least 2–3 students for each category.) Then, instruct students to review all the topics for their category and decide which they would like to create and present a review activity for.

Each group will spend the remainder of the lesson creating and planning an activity that reviews a topic crucial to understanding the flying environment. More details will follow in **EXPLAIN**.

A group need not limit itself to a single sticky note; a review activity may cover several related topics, if appropriate. For example, one group may decide to review how pilots communicate with ATC to request clearance for entering each class of controlled airspace. Before proceeding to **EXPLAIN**, check in with each group to ensure its topic is appropriate.

Teaching Tips

You will need to determine, based on the number of students and the class time available, how long each presentation will be. Announce this limit before students choose their topics; each group should choose a topic that is substantial enough to fill a complete presentation without requiring additional time.

EXPLAIN

Teacher Material: Review or Project Presentation
Student Material: Review or Project Student Activity

Slides 7-8: Once you have approved each group's chosen topic(s), regather as a class. Explain that students will work in their small groups to create an activity that reviews their chosen topic(s); groups will then present their review activities to their classmates. Remind students of the amount of time that each group will have to present, and emphasize that each review should be clear and comprehensive within the available time. For example, consider again the aforementioned group that plans to review how pilots communicate with ATC to request clearance for entering each class of controlled airspace. This group should not write an elaborate skit that illustrates only the need to request permission to enter Class C airspace. A more appropriate skit might consist of a series of short radio exchanges modeling the required radio communication and granting of clearance (or not) to enter Class B, C, and D airspaces; it might also briefly contrast these three controlled airspaces with Class A and E airspaces.

A group's review activity may take a variety of forms, provided it culminates in a presentation for the class. Here are some possible options:

- A traditional lesson or slideshow presentation
- A "gallery walk"
    - Half of the groups set up their presentations at locations around the classroom.
    - The other groups move from presentation to presentation.
    - Groups then switch so that everyone has a turn both to present and to attend presentations.
- A live skit or YouTube video modeling correct pilot procedures or pilot decision-making
- A "Choose Your Own Adventure"-style slideshow or card game
    - Students read an aviation-themed story in which they are the protagonists (e.g., pilots navigating a thunderstorm).
    - At various points in the story, students must make specific decisions relating to flight safety; each decision results in a different set of consequences for the flight.
- A podcast
    - An audio format may work well for students interested in modeling correct radio phraseology and communication procedures.
- A classwide game of "Jeopardy."
    - See the links in the Teaching Tips box, below, for guidance.

Teaching Tips

For groups struggling to come up with an activity, share with them the descriptions and examples listed above.

Also, the following are video resources for any groups that may wish to create a Jeopardy-style game.

- "How to Create a Jeopardy-style Game in Google Slides" (Length 5:57)
  https://video.link/w/Gzjs

For teachers who are unable to access Safe YouTube links, the video may also be found here:
https://www.youtube.com/watch?v=ocjcTg7SP1I

- "How to Make a Jeopardy Game in PowerPoint" (Length 3:54)
  https://video.link/w/Mjjs

For teachers who are unable to access Safe YouTube links, the video may also be found here:
https://www.youtube.com/watch?v=_EvsMMaM-wY

Having students use Google Slides to create their Jeopardy-style game is recommended, since students at different locations can work simultaneously in a shared presentation.

Slide 9: Complete the **Formative Assessment**.

Formative Assessment

Provide students with **Review or Project Student Activity**. Each group should plan its review activity and submit its plan for your approval before proceeding to **EXTEND**. Make sure that time estimates are appropriate and that tasks are distributed equitably amongst group members. Everyone should take part in creating and giving the presentation. This does not necessarily mean that every member must speak directly to the class, but members who do not participate in this way should contribute to the presentation in some other way. For example, running the slideshow or staying "on book" during the skit, in case the performers forget their lines.

Each group member should complete the activity worksheet, so that everyone has a copy, but the group needs to submit only one copy for approval.

[DOK-L3; *strategic planning*]

EXTEND

Teacher Material: Review or Project Presentation

Slide 10: Students have the rest of the session to meet in their groups, create their review activities, and practice their presentations. As groups work, monitor their progress, facilitating and advising as needed. Remind them to practice their presentation once they complete their review activity.

Teaching Tips

Check in with each group at least once—at the end of Session 1 or the beginning of Session 2—to ensure that all activities and presentations are on track.

EVALUATE

Teacher Material: Review or Project Presentation

Slide 11: Conduct the **Summative Assessment**. Be sure to share the grading rubric with students so that they know what is expected of them.

Summative Assessment

Each group will present its review activity to the class. If time is tight and space permits, consider dividing the class into clusters, each consisting of several groups; clusters will present simultaneously, but the groups within a particular cluster will present only to each other.

[DOK-L3; *application*]

Summative Assessment Scoring Rubric

- Student follows assignment instructions.
- Student participates equitably in the presentation.
- Presentation demonstrates understanding of the key concepts relevant to the selected topic(s).
- Contributions show in-depth thinking including analysis or synthesis of lesson objectives.

Points	Performance Levels
9-10	The group employs an effective format (slideshow, gallery walk, etc.), works effectively and equally as a group, and presents a thorough review of their topic.
7-8	The group employs a sufficient format (slideshow, gallery walk, etc.), works sufficiently as a group with some disparities in effort among students, and presents a sufficient review of their topic.
5-6	The group demonstrates little thought or effort in the use of their presentation format, demonstrates unequal efforts among students in the group, and presents a partial review of their topic.
0-4	The group lacks a useful format to present their topic, demonstrates unequal efforts among students in the group, and presents a vague review of their topic.

STANDARDS ALIGNMENT

COMMON CORE STATE STANDARDS

- **CCSS.ELA-LITERACY.RST.11-12.2** - Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
- **CCSS.ELA-LITERACY.RST.11-12.4** - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
- **CCSS.ELA-LITERACY.RST.11-12.7** - Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
- **CCSS.ELA-LITERACY.RST.11-12.9** - Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
- **CCSS.ELA-LITERACY.SL.11-12.1** - Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11-12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
- **CCSS.ELA-LITERACY.SL.11-12.1.B** - Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed.
- **CCSS.ELA-LITERACY.SL.11-12.1.C** - Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.
- **CCSS.ELA-LITERACY.SL.11-12.2** - Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.
- **CCSS.ELA-LITERACY.SL.11-12.4** - Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.
- **CCSS.ELA-LITERACY.SL.11-12.5** - Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
- **CCSS.ELA-LITERACY.SL.11-12.6** - Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate. (See grades 11-12 Language standards 1 and 3 here for specific expectations.)

REFERENCES

https://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/categories/

https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/media/17_phak_ch15.pdf