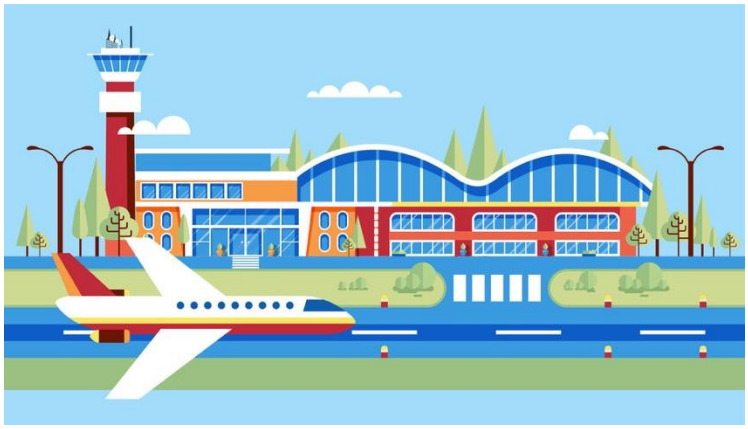
Student Material

# Airport Problem



People rely on airplanes daily to take them on important business trips or to their favorite vacation spots. However, as people travel more regularly, lines and waiting times at airports have begun to lengthen.

Wouldn't it be nice if airports were as reliable and efficient as the airplanes they house?

Instead of complaining about the problem, why don't we try to solve it? Another airport in your state, depending on its location, could provide greater accessibility, ease, and comfort to air travel.

Where do you think this new airport should go and with whom should you share your vision?

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# **Airport Problem** *Rubric*

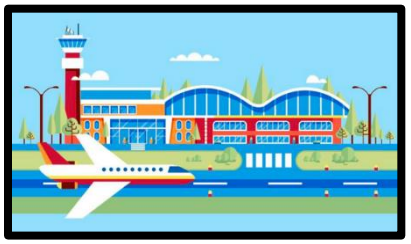
Student Material

| | | *Novice* | *Apprentice* | *Practitioner* | *Expert* |
|---|---|---|---|---|---|
| **Location** | | makes statements to support location in one or more of the following areas:<br>▪ topography<br>▪ population centers<br>▪ accessibility by roadways or other transportation | lists facts to support location in two or more of the following areas:<br>▪ topography<br>▪ population centers<br>▪ accessibility by roadways or other transportation | lists detailed facts to support location regarding:<br>▪ topography<br>▪ population centers<br>▪ accessibility by roadways or other transportation<br>▪ environmental factors | all of *Practitioner* plus: anticipates and responds to arguments against location in one or more areas listed under *Practitioner* |
| **Benefits of Location** | | identifies benefits of proposed airport location | describes at least four benefits of proposed airport location that solve at least two different issues currently faced by travelers | connects at least four benefits of proposed airport location as solutions to four distinct issues currently faced by travelers | all of *Practitioner* plus: includes short-term and long-term benefits of the proposed airport location |
| **Potential Negative Effects of Location** | | identifies at least one potential negative effect of the proposed airport location | describes two or more potential negative effects on the surrounding area because of the proposed airport's location | ▪ identifies at least four potential negative effects of the proposed airport<br>▪ connects negative effects to specific groups in the surrounding area<br>▪ brainstorms possible counterarguments to proposed location | all of *Practitioner* plus: weighs the pros and cons with evidence to respond to counterarguments of the proposed location |
| **Map of Proposed Airport Location** | | map includes:<br>▪ clearly marked location<br>▪ title<br>▪ compass rose<br>▪ cities<br>▪ landforms | map is drawn to scale and includes:<br>▪ clearly marked location<br>▪ title<br>▪ compass rose<br>▪ counties<br>▪ cities | ▪ map is drawn to scale and includes title, clearly marked airport location, compass rose, and marked counties and cities<br>▪ map is of a 50-mile radius of the location and includes relevant landforms, such as: bay, desert, gulf, island, isthmus, lake, mesa, ocean, mountain, strait, peninsula, plateau, river, valley, etc. | all of *Practitioner* plus:<br>▪ latitude and longitude are included on the map<br>▪ elevation of airport location and surrounding areas are included on the map |
| **Visuals** | **Choices** | includes at least one chart or graph of related information | includes at least one chart and one graph that support recommendation | includes supportive charts and graphs and those that counter anticipated protests; all sources of data are cited | includes explanation of process for deciding which charts and graphs to include |
| | **Quality** | two out of four criteria under *Practitioner* | three out of four criteria under *Practitioner* | ▪ neatly constructed<br>▪ titled<br>▪ labeled<br>▪ colored to make the data easier to understand | all of *Practitioner* plus: at least one computer-generated graph that includes "what if" analysis features |

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# Airport Problem *Scaffold for Learning*

Teacher Material



**Benchmark Video and Discussions**

- Unit launch to create a felt need for the task
- The Circle-Angle Connection
- Explicit vs. Implicit

## Instructional Activities: Learning

### Instructional Texts/Websites

- Read and understand a physical map
- Decompose angle parts
- Quote from a text
- Multiply multi-digit numbers using standard algorithm
- Identify main idea and supporting details (IV)
- Cite sources
- Counterarguments (I, P)
- Explicit/implicit meaning

### Instructional Videos

- Read and understand a physical map
- Decompose angle parts
- Quote from a text
- Multiply multi-digit numbers using standard algorithm
- Identify main idea and supporting details (IV)
- Cite sources
- Counterarguments (I, P)
- Explicit/implicit meaning

### How-to Sheets

- Use a protractor
- Read a physical map
- Draw/identify angles
- Create a compass rose
- Trace the development of a main idea
- Multiply multi-digit numbers using standard algorithm
- Cite sources
- Create charts/graphs

### Interactive Websites

- Measuring Angle Game
- Maps and Directions
- Explore the World! (I, P)
- Khan Academy — math
- Freerice.com (HW)

### Learning Centers

- Measure with a protractor (I, P)
- Read and interpret a physical map (P, SG)
- Compare and contrast right, acute, and obtuse angles (P)
- Connect main idea and details (I, P)
- Sort — implicit and explicit meaning (P, SG, IV)

### Small-Group Mini-Lessons

- Read and understand a physical map
- Decompose angle parts
- Quote from a text
- Multiply multi-digit numbers using standard algorithm
- Identify main idea and supporting details
- Cite sources
- Counterarguments
- Explicit/implicit meaning

## Instructional Activities: Additional

### Practice

- **Find examples of maps (I, P)**
- **Locate angles in everyday life (HW)**
- **Research airport locations (I, P)**
- **Research examples of physical maps (I, P, SG)**

### Application

- **Compare and contrast political and physical maps (I, P)**
- **Identify and classify angles (I, P)**
- **Trace main idea development (I, P)**
- **Evaluate reasons and evidence (I, P)**

### Assessment

- **Using rubric, self-assess task (I)**
- **Using rubric, peer reflect (P)**
- **Self-assess angles (I)**
- **Self-assess map understanding (I)**
- **Self-assess imp./explic. meaning (HW)**

### Reflection

- **Discuss with a partner how it felt to create a solution to a problem (P)**
- **In your *Efficacy Notebook* ask, "What was easy/challenging for you? Was solving this problem something you can see doing in your future? Why or why not?" (I)**

**Key**: Individual **(I)**, Pairs **(P)**, Small Groups **(SG)**, Activities suitable for homework **(HW)**, Insights Video **(IV)**

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**Airport Problem** *Content Facilitation Grid (Week 1 Sample)*

| Student | Identifies components of angles | Uses a protractor to measure angles | Classifies angles as *acute*, *obtuse*, or *right* | Uses standard algorithm to multiply multi-digit numbers | Identifies physical and political maps | Identifies similarities and differences between physical and political maps | Reads physical map | Identifies multiple main ideas in a text | Traces evolution of main idea | Connects main idea with supporting details | States explicit meaning of a text | Quotes accurately from a text | | | |
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Teacher Material

# **Airport Problem** *Differentiation Grid*

When you stand before your class to teach them a skill, you can be sure that all students are not in the same place cognitively or in terms of learning styles. Thus, your instruction is only moderately effective. Differentiated instruction encourages you to use several different activities to meet the needs of all learners. Select a skill you might teach. Consider the student who already knows the skill you're about to teach, the student who is cognitively ready, and the student who lacks the prerequisite knowledge to learn the skill. Then, for each, consider three possible levels of learning styles. Brainstorm nine different ways to get the same skill across to the student (note: These needn't all be teacher-directed lessons). You probably will never have nine different activities going on at the same time for a skill, but you might choose three.

**SKILL: Map Skills**

| | **DISTAL ZONE**<br>*A student who will be challenged to learn this skill/concept or lacks the pre-requisite skills needed.* | **PROXIMAL ZONE**<br>*A student who is ready to learn this or is on grade level.* | **CURRENT KNOWLEDGE**<br>*A student who is ready to move beyond this or is above grade level.* |
|---|---|---|---|
| **VISUAL** | Attend mini-lesson on map skills using map templates | Draw a map of the state, using labels and symbols | Create a map of the state on the computer, using labels and symbols |
| **AUDITORY** | Work with a peer tutor in a learning center activity on map skills | Complete an interactive PowerPoint presentation with audio explanations | Create an interactive PowerPoint presentation with audio explanations |
| **KINESTHETIC / TACTILE** | Manipulate symbols and labels onto a pre-existing map | Map your classroom into a life-size map using labels and symbols | Create a 3D model of a map for your state, including map vocabulary and landforms |

** Readiness categories taken from Lev Vygotsky's work on the Zone of Proximal Development*

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# **Airport Problem** *Transfer Task*

**Escape Route:**

Have you noticed that our weather patterns have been changing lately? More than in any previous decades, we are suffering from an abundance of significant storms.

Your task is to analyze our state map and determine a safe evacuation route from three major cities. Additionally, identify locations for FEMA to set up temporary shelters during times of dangerous flooding.

As you plot your evacuation route, be sure to do the following:

- Draw a map to scale of the evacuation route
- Clearly identify the closest and safest location for shelters for each city
- Include a title and labeled cities/counties passed through
- Display a compass rose to orient travelers
- Label relevant landforms (e.g., bay, desert, gulf islands, ocean, mountain, valley, plateau, etc.)

To support your evacuation route, develop a short (three- to five-paragraph) description of why your evacuation routes are the best options. Be sure to do the following:

- Relay a clear claim
- Explain the argument
- Contradict a counterargument
- Include domain-specific language
- Follow standard grammar, spelling, and punctuation rules
- Maintain a formal tone

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# **Airport Problem** *Teacher Notes*

Teacher Material

| **Unit Overview** |
|---|
| Air travel has become a vital part of our transportation infrastructure. Cities and suburbs are growing, and additional airports may help reduce waiting times at ticket counters and security checkpoints. Students will learn and apply geometry and geography as they determine where to build an airport for their community. |
| **Common Core Standards Addressed** |
| CCSS.ELA-Literacy.RI.4.1; CCSS.ELA-Literacy.RI.5.1;<br>CCSS.ELA-Literacy.RI.4.2; CCSS.ELA-Literacy.RI.5.2;<br>CCSS.ELA-Literacy.RI.4.3; CCSS.ELA-Literacy.RI.5.3;<br>CCSS.ELA-Literacy.RI.4.7; CCSS.ELA-Literacy.RI.5.7;<br>CCSS.ELA-Literacy.RI.4.9; CCSS.ELA-Literacy.RI.5.9;<br>CCSS.ELA-Literacy.W.4.1; CCSS.ELA-Literacy.W.5.1;<br>CCSS.ELA-Literacy.W.4.6; CCSS.ELA-Literacy.W.5.6<br><br>4.NBT.B.5; 5.NBT.B.5; 4.MD.A.1; 4.MD.A.2; 4.MD.A.3; 4.MD.C.5; 4.MD.C.6;<br>5.MD.A.1; 4.G.A.1; 5.G.A.2; 5.G.B.3; 5.G.B.4 |
| **Other National Standards Addressed** |
| NSS-G.K-12.1; NSS-G.K-12.2; NSS-G.K-12.4; NSS-G.K-12.5; NSS-G.K-12.6 |

| **Enduring Understandings** | **Essential Questions** |
|---|---|
| • Geography influences needs, culture, opportunities, choices, interests, and skills.<br>• There is a relationship between the consumption and conservation of natural resources.<br>• Standard units of measurement enable people to interpret results or data. | • How do geography, climate, and natural resources affect the way people live and work?<br>• Why do people need to know standardized units of measurement?<br>• What is the purpose of converting measurements? |

| **21st Century Skills Addressed** | |
|---|---|
| *Core Content and Interdisciplinary Themes*<br>• Subject-Area Mastery<br>• Global Awareness<br>• Civic Literacy<br>• Environmental Literacy<br>*Learning and Innovation*<br>• Creativity and Innovation<br>• Communication and Collaboration<br>• Critical Thinking and Problem Solving | *Information and Media Literacy*<br>• Information Literacy<br>• Media Literacy<br>• Information and Communication Technology<br>*Life and Career*<br>• Flexibility and Adaptability<br>• Initiative and Self-Direction<br>• Productivity and Accountability<br>• Leadership and Responsibility |

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