LESSON: Weather Console and Job Assignments

Title: Weather Console and Job Assignments
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Lesson Overview:

By now the students should be getting pretty excited for the launch simulation. This lesson is designed to give the students practice with the KLASS weather console and to help decide who will be on the weather team. The PowerPoint is designed to talk through the Launch Commit Criteria (LCC). Along with the data sheets for each job the PPT can be used not only as an overview but as instructions and background information for each part of the weather console and the launch countdown data collection**.**

If you cannot get the KLASS console to run, skip down to the extensions area of this document to find some helpful weather links that will allow you to continue the lesson.

Suggested Classroom Time: 120-180 minutes

Grade Levels: 6-10

KLASS Module: 1-Training

Topic/Console: Weather Console

Materials Needed:

Activity	Documents	Other Materials
1	PRES_Weather.ppt PRES_Weather.pdf	Demonstration computer with projection and Microsoft PowerPoint
2	KLASS Weather Console ACT_Launch-Journal.doc (in KLASS_Consoles) ACT_Weather-Console-Weather-Tech.doc ACT_Weather-Console-Meteorlogist.doc ACT_Weather-Console-Weather-Officer.doc ACT_Weather-Console-Launch-Director.doc	Student computers with KLASS and Internet connection

National Standards/Objectives:

Discipline	Standard	Objective
Science	F. Science in Personal and Social Perspectives	Students understand the risks and benefits and the importance of environmental quality.
Science	Science as Inquiry	Individuals can use a systematic approach to thinking critically about risks and benefits.
Technology	Technology problem-solving and decision-making tools	Students use technology resources for solving problems and making informed decisions.
Technology	Basic operations and concepts	Students are proficient in the use of technology.
Technology	Technology productivity tools	Students use technology tools to enhance learning, increase productivity, and promote creativity.
Technology	Technology problem-solving and decision-making tools	Students employ technology in the development of strategies for solving problems in the real world.
Math	Numbers and Operations	Students understand numbers, ways of representing numbers, and compute fluently and make reasonable estimates.
Math	Data Analysis and Probability	Students formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them and develop and evaluate inferences and predictions that are based on data.
Math	Problem Solving	Students solve problems that arise in mathematics and in other contexts and monitor and reflect on the process of mathematical problem solving.
Math	Communication	Students organize and consolidate their mathematical thinking though communication; communicate their mathematical thinking coherently and clearly to peers, teachers, and others; and analyze and evaluate the mathematical thinking and strategies of others.
Math	Connections	Students recognize and apply mathematics in contexts outside of mathematics.

Desired Results:

Students will be able to answer these essential questions

- What weather conditions are necessary for a successful Shuttle Launch?
- How does mathematics help the weather team predict the weather at the Launch Pad and during the Launch Countdown?

Students will know

- What tools are necessary to monitor launch weather conditions and what the launch weather constraints.
- Launch weather constraints and launch commit criteria (LCC) for weather.
- Mathematical concepts necessary to create weather data for the launch.

- How to read the KLASS Weather Console

Students will be able to

- Predict, read, and adjust their predictions for launch weather using the KLASS Weather Console.
- Apply launch weather constraints.
- Collect data using the KLASS Weather Console for the launch countdown.
- Compute weather trends for a successful launch.
- Reflect on what they learned by reading the overviews.

Learning Plan/Activities:

1. **Preparing for the Lesson.**
   Print a copy of the PRES_Weather.pdf as a reference/text for each student. This is a large document, so you may want to choose the slides you will print. Print all of the worksheets and the student journal. Create a packet of these for each student with the journal page on the front. The data you collect from these packets will help you decide who can do which jobs. You will be able to pair students as appropriate.

   Study all relevant background material so you have a firm grasp of the process and launch criteria and ceiling rules. Create a plan for students to practice using their job worksheet with the weather console.

   Set up your projection for the PowerPoint so that all students can see it, and review the slides referencing the notes that have been provided in the PowerPoint notes area. You can print these notes so you have them handy as you are presenting (File◊Print◊choose Notes and Print).

2. **Introducing the Lesson.**
   Script: “The space shuttle team relies on a highly dedicated group of weather officers to help determine whether or not weather conditions are GREEN (go for launch) or RED (no go for launch). They actually hire the United States Air Force to help with this major task. The Launch Weather Officer (LWO) plays a very critical role in making sure that all personnel are safe, that all systems are protected against the weather, and that her client, NASA remains satisfied with the job that she and her team of meteorologists at the 45th Weather Squadron are performing. The weather console is a very active console, with four different screens or views. The weather team will actually consist of many job roles. As you have seen on our job roles sheet (RDG_KLASS-Team-Roles.doc), the weather console requires a LWO, at least 2 meteorologists, and several more weather technicians. Keep this in mind as we go through the roles and responsibilities leading up to launch for the weather console team.”

3. **Providing Overview and Asking Big Questions.**
   Tell students that the purpose of this lesson is to familiarize them with the weather console and the job assignments. Ask students to complete the first part of their Student Journal. Begin the PowerPoint, discuss each slide and ask for questions. As you present the information ask students to follow along with their reference text so that they can make notes and connections.

   There are 4 different job titles (Launch Commander, Weather Officer, Meteorologist, and Weather Technician). When you reach the launch commander slide, tell students that you will be looking carefully at their reference texts notes and the practice data pages to determine who would be a good launch commander.

4. **Evaluating the Lesson.**
   As you come to each job, ask students to complete the data sheets for that job. This is the set that they will hand in so you can assess their work. When the PowerPoint is complete ask students to complete Day One Student Journal and turn in their work. Debrief the lesson with the students. “What went well? What didn’t? What could have been done differently?”

5. **Practicing Job Assignments.**
   During the next class session, tell students that the purpose of this lesson is practice for their job assignments. Ask them to take out their reference texts so that they can review what they need to know for their job. Pass the Journal Pages back out to the students. Ask students to complete the first part of their Day Two Student Journal before you begin the pre-launch tasks.

   Provide students with their job assignments and practice work sheets and the display for practice. This could be done in a lab setting just as you would do the real launch. You will need to work closely with the Launch Commander (LC) to define the logistics of the launch, stations, etc. so that the LC will feel comfortable with their role.

   Begin practice for Launch Day by helping students to bring up the weather consoles and reminding them how get to the various views. Also help them get the necessary bookmarks for the outside weather sites that will be used to practice getting the data. Monitor their data sheets to be sure they are doing it correctly. Students should come prepared with scrap paper or calculators, depending on your rules for doing the conversions. Anticipated a bit of noise as the students should be communicating with their team mates throughout the practice run.

   When it is complete ask students to complete the day two student journal and hand in their job practice sheet with their journal pages. Debrief the lesson with the students. What went well? What didn’t? What could have been done differently?

6. **Practicing Job Assignments Continued.**
   If the practice launch went well the day before, tell students today the launch could really happen. Ask them to take out their reference texts so that they can review what they need to know for their job. Ask if they have any final questions. Pass the Journal Pages back out to the students. Ask students to complete the first part of their day three student journal before you begin the launch. Provide students with their job assignments and data work sheets and tell them to report to their stations. Ask the launch commander to go over the logistics of the launch with them before you begin. This could be done in a lab setting just as you would do the real launch.

   Begin the Launch. Try to give less direction on this day, and let students figure things out or ask their team members for help. When the launch is over, debrief with the students. Let the launch commander ask the questions and write down the answers on their student journal. What went well? What didn’t? What could have been done differently? When it is complete ask students to complete the day three student journal and hand in their job sheets with their journal pages.

   Use the debrief notes to design the next shuttle launch.

Assessment Evidence:

Performance Tasks

1. Students will be able to monitor and record data using the KLASS weather console and the data sheets.

2. Students should begin to understand the function of their KLASS role and feel good about helping to launch the shuttle with the data that is referenced and used during the simulation.

Other Evidence

1. The student journal entries, teacher observations and daily debriefing sessions should help you decide if the students really understand by now.

Extensions and Going Further:

- If students are feeling comfortable, swap job roles after the first day. Since some data sheets require computation and others do not, it would be good for the students to get different exposure.

- There are many ways that the teacher can use the teacher console to fail the launch. Practice different scenarios each time and fun changing things up so no two launches are ever the same.

- Go to real-time weather sites to extend these data sheets. As well, the National Weather Service has special forecasts and weather data just for KSC. Look around and see if you can extend the lesson with this information.
  http://forecast.weather.gov/MapClick.php?site=MLB&llon=-81.089583&rlon=-80.424583&tlat=28.895417&blat=28.230417&smap=1&mp=1&map.x=144&map.y=102

- From this site students can look at the trends and the barometric patterns from a historical perspective. This may be a great place to start if the KLASS consoles go too fast for them initially. You could put the pressure of time constraints on the students to help emulate the urgency of recording the data by yelling out time warnings to help prepare them for the pressure of the launch.
  http://www.weather.gov/data/obhistory/KTTS.html.

- From this site some times test/test forecasts KSC are available, and some seem to be updated daily. It even tells you which landing rules are broken, which is cool. Keep in mind that launch and landing criteria are different, though. http://www.srh.weather.gov/smg/SMG_prod.php?pil=OAV&sid=JSC&version=0.

- Be sure to check for student opportunities, additional educational resources and more at:
  http://www.nasa.gov/education.