1.3 CHROMAKEY CURRICULUM FOR A HIGH SCHOOL METEOROLOGY CLASS

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1. INTRODUCTION

The meteorology class at Concord-Carlisle High School (CCHS) collaborates with CCTV, the local access television station, to give students a weekly experience researching, producing, and filming a weather related feature as part of the regular curriculum, introducing students to broadcast meteorology. This collaboration has several benefits for the students in reinforcing meteorology content, developing presentation skills, and providing differentiated instruction. Students prepare their own chroma-key backgrounds (still images, Keynote and Powerpoint presentations, video) and scripts and are then filmed in the studio. These presentations complement and reinforce what is being presented in the classroom that week. This is believed to be a unique collaboration between a high school meteorology class and a public access television station. In addition to the television studio work, meteorology class students produce one radio forecast per quarter that is aired on WIQH, the student radio station.

2. WEEKLY PRESENTATION

Once a week the students have "Green Screen Friday" at the CCTV studios, where they record a video production that they have created. While we use a format that is similar to that used by television weather broadcasts, not all of our presentations are forecasts. In fact, most of them serve to reinforce and explore topics that were covered that week in class.

Typical Green Screen Friday Topics:

- Weather Forecast
- Explain Condensation Phenomena
- Present Original Cloud Picture
- Explain Features on Weather Map
- Show pattern of sea surface temperatures and hurricane tracks
- Explain Optical Feature
- Relate Air Pressure Concepts to Everyday Situations (i.e. - How does a drinking straw work?)

2.1 *Studio Layout*

The staff at CCTV set up the studio for the students, who are the on-air "talent". FIgure 1 shows the layout of the studio. A one camera shot is used with the normal green screen background. Students have monitors set up on either side of them to help see what they are pointing at. The large monitor is positioned for the remainder of the class to be able to see the final product in real time. CCTV staff work the control room where names can be added with a computer graphics interface and the final product is taped. They then edit any programs that will air on public access television and give the rough tape to the class for later viewing, assessment, and critiquing.

Figure 1 - **Preparing for a shoot in the CCTV Studio**

2.2 *Student Productions*

Each week the meteorology class concludes with student presentations at the CCTV studios. Topics are assigned mid-week, after a day or two spent learning new material, and students then begin their research on that week's subject. This research can include finding the answer to a question, looking for sample images of phenomena discussed in class, and locating weather maps. Backgrounds are produced by the students and

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consist of either a single image or Keynote/Powerpoint presentation, which the students can "click" through while making their presentation. Anything that can be displayed full screen on a computer can be displayed behind the students. The assignment requires both academic skills to find the answer, and technology skills to create the presentation.

Figure 2 - Condensation on Iced Coffee Cups

Figures 2 and 3 show screen images from student presentations on Condensation Phenomena. During the week we learned about dew point, saturation, wet bulb temperature, fog, and clouds. In order to take this lesson out of the classroom, students were told to find images they had taken of condensation phenomena and explain why they were occurring. In FIgure 2, the student is explaining why condensation is forming on the ubiquitous iced coffee cup. Figure 3 shows low level clouds the student photographed while hiking in New Hampshire's White Mountains.

Figure 3 - Clouds in the White Mountains

2.3 *Value of Lessons*

The topics presented on Green Screen Friday serve two purposes: to reinforce that week's lessons and to continually develop the students' presentation skills. Topics range from examples of condensation, to optical phenomena, to weather map interpretation. Often students have the opportunity to presents pictures and videos that they have taken themselves. The semester of studio work builds towards their final presentation, which includes explaining a concept learned during the year and preparing a two day weather forecast, complete with original maps and graphics. The best ones air on CCTV.

Meteorology is a very visual science. In preparation for their presentations, students scour the internet for images to support their topic and must provide a detailed explanation that goes beyond classroom discussions.

Beyond content, standards, and frameworks applications, Green Screen Friday provides a means for the non-traditional student to shine. The traditional classroom can be challenging, especially for those students on Individual Education Plans (IEPs) and 504 Plans (in accordance with the Americans with Disabilities Act). Skills beyond note taking are valued in the studio. Students who are good speakers (through drama experience or simply self-confident), artists, and/or technical whizzes are given a venue to shine and develop great self-confidence. This often translates into success in other aspects of the course. A student run survey of the participants in this class clearly shows these benefits.

3. STUDENT SURVEY

A survey was conducted of the Fall 2009 CCHS Meteorology Class to obtain feedback on the impact of the Green Screen Friday experience. Students were asked to answer questions from 1 (strongly disagree) to 5 (strongly agree). Results from the survey, along with comments associated with each question are shown in the box on the following page.

One of the key things learned from this survey is the value of Green Screen Fridays in developing the students' presentation skills. They indicated that the presentations done in this one semester meteorology class make up 60-80% of the presentations they do in their four years of high school. Student comments in the summary box demonstrate the value of doing these presentations.

In addition, it is clear that the weekly presentations, both in their presentation value and encouraging real world

research add greatly to the student enjoyment of the class.

Summary of Student Survey

Creating a presentation for Green Screen helps to reinforce material taught in class. Average: 4.14

"[Green Screen] helps back up the information we've learned, and it makes the class more hands-on…."

"[Green Screen] helps me with learning the material…."

Doing weekly Green Screen presentations helps to improve public speaking skills.
Average: 4.68

"[Green Screen] has made me more comfortable presenting."

"I absolutely love GSF. It … helps me with my public speaking skills."

Creating a presentation for Green Screen enables me to apply information learned in class.
Average: 4.41

"It really helps in applying info learned in class."

Doing weekly Green Screen presentations has made me more comfortable in front of a camera.
Average: 4.50

"I think GSF is really excellent, especially, for public speaking and confidence in front of a camera."

Creating a Green Screen presentation allows me to exhibit artistic talents.
Average: 3.68

Overall, my experience with Green Screen has been...
Average: 4.45

"It's a great experience that I enjoy being a part of. "

"I think the green screen is an amazing resource for the class and makes class, and the material, more interesting."

"A valuable experience that allows students to learn, not only about meteorology, but about presentations…."

4. CONCORD-CARLISLE WEATHER SERVICES (CCWS)

In addition to classroom applications, the use of the CCTV studios and the chromakey backgrounds has lead to the formation of Concord-Carlisle Weather Services. This group of students is responsible for producing and recording forecasts for CCTV and WIQH (the school radio station.) By the Spring of 2010 the group hopes to take over the school meteorology website (www.cchsweather.com) and generate on-line content, including forecasts, blogs, and a "chance of a snow day" prediction. (The latter is something very important to all students in snowbelt states!) Figure 4 shows the final product as it would be seen on television. All graphics are produced by CCWS students using Photoshop and Keynote.

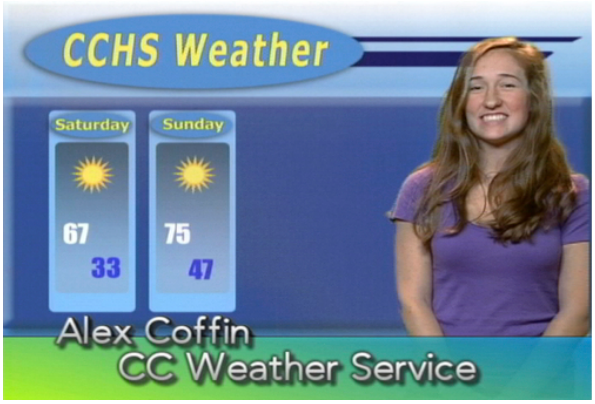

Figure 4 - CCWS Forecast

5. BENEFITS OF USE OF CCTV STUDIO OVER CLASSROOM

The assistance of CCTV staff greatly frees up the teacher to be able to teach. There is no studio prep time required for the teacher (though rewarding time is spent with the CCTV staff to continuously enhance the experience) and the CCTV camera person and control board operator allow the teacher to stand on the line with the students to give them pointers. Students are coached in general presentation techniques, and those specific to chroma-key studio work.

The technology available in the studio allow students to create backgrounds using Powerpoint, Keynote, JPG files, or anything that can be displayed fullscreen on the class MacBook Pro. Students become much more engaged when they are not limited to single digital images. From assignment of the topic to final presentations, students need to do on-line research, take original digital photos, prepare graphics and become comfortable on camera.

Final, DVD quality videos are ready at the end of the studio session. This allows student to view and critique presentations the next day that class meets. Students have a real television studio experience, with exposure to all aspects of production and a program for airing their work. The ability to have productions broadcast excites the students and can lead to other television opportunities.

In addition, the availability of the studio makes it possible for students to schedule their own time to

practice presentations. It has also lead to the creation of Concord-Carlisle Weather Services, a group of students that produce radio, television, and internet content outside of class.

We originally tried to do the green screen presentations in the classroom with a green screen sheet background, a Sony Handycam, a single spotlight, and Adobe's Ultima software running on a PC. It seemed ideal to do this project in the classroom, with easy access to other classroom resources and convenience of filming in the same place that we taught, but we ran into several difficulties. Due to the limitations of a personal PC, we could not record our work in real time. The software we used did allow for us to operate in a preview mode, so the students could see what they looked like in real time. However, the quality was poor, due to computer software/hardware limitations and sound and lighting issues in the classroom. It turned out that desktop PCs are unable to handle multiple, realtime, high quality video streams so we had to record the video of the student just in front of the green screen and then in post-production put the background in behind them, creating a long time delay between filming and the availability of videos to view in class.

The biggest drawback was that due to the cumbersome nature of the classroom production, the teacher had to focus on the technical side of the production and was not available to work with the students while they were being filmed. This greatly reduced the amount of instruction and the learning curve of students doing their presentations was much slower.

6. MASSACHUSETTS FRAMEWORKS

The weekly presentations provide content reinforcement and enrichment in line with Earth and Space Science standards and Technology frameworks. These are the frameworks that drive the content of the class and are shown in the box below.

More important than having a good idea is having the ability to share it. With Green Screen Friday, students get a weekly opportunity to develop these skills. Most students make more presentations in this class than in the rest of their high school career combined, helping to address not only Earth and Space Science standards, but English Language Arts standards in the

Key Massachusetts English Language Arts Curriculum Frameworks

27.6 Create media presentations that effectively use graphics,images,and/or sound to present a distinctive point of view on a topic.

27.7 Develop and apply criteria for assessing the effectiveness of the presentation, style, and content of films and other forms of electronic communication. (Continue to address earlier standards as needed as they apply to more difficult texts or media productions.)

27.8 Create coherent media productions that synthesize information from several sources.

Key Massachusetts Science and Technology/ Engineering Curriculum Frameworks

I. CONTENT STANDARDS

1. Matter and Energy in the Earth System

1.1 Identify Earth's principal sources of internal and external energy, such as radioactive decay, gravity, and solar energy.

1.2 Describe the characteristics of electromagnetic radiation and give examples of its impact on life and Earth's systems.

1.3 Explain how the transfer of energy through radiation, conduction, and convection contributes to global atmospheric processes, such as storms, winds, and currents.

1.4 Provide examples of how the unequal heating of Earth and the Coriolis effect influence global circulation patterns, and show how they impact Massachusetts weather and climate (e.g., global winds, convection cells, land/sea breezes, mountain/valley breezes).

1.5 Explain how the revolution of Earth around the Sun and the inclination of Earth on its axis cause Earth's seasonal variations (equinoxes and solstices).

1.6 Describe the various conditions associated with frontal boundaries and cyclonic storms (e.g., thunderstorms, winter storms [nor'easters], hurricanes, tornadoes) and their impact on human affairs, including storm preparations.

1.7 Explain the dynamics of oceanic currents, including upwelling, deep-water currents, the Labrador Current and the Gulf Stream, and their relationship to global circulation within the marine environment and climate.

1.8 Read, interpret, and analyze a combination of ground-based observations, satellite data, and computer models to demonstrate Earth systems and their interconnections.

Massachusetts Curriculum Frameworks, as shown in the box on the previous page. Each week students create a media presentation that incorporates graphics and images that they find on-line or take themselves to support an argument or discussion they are making. The assistance of CCTV allows the teacher to focus on assessing the presentations as they are being made and provides videos of the presentations that can be shown and evaluated the next week in class. Through all of this, the students are required to bring together their presentations using different media, technologies, and software (Powerpoint, Keynote, Quicktime, etc.)

7. CONCLUSION

To date, over 100 Concord-Carlisle High School students have participated in the Meteorology Class and/or Concord Carlisle Weather Services. They have benefited greatly from this unique program, not just in improving their knowledge of meteorology, but in developing presentation skills and confidence that they will carry forward in any future ventures.

8. ACKNOWLEDGMENTS

A large portion of the funding used to start up this program was provided by the Concord Education Fund. As stated in its mission, The Concord Education Fund is an independent organization that avidly supports the pursuit of excellence in the Concord Public Schools and Concord-Carlisle High School, by granting funds for the development of curricula, programs, and initiatives designed to enhance the experience of education of students and teachers.

None of this work would be possible with the time and dedication of the staff at CCTV. Charles Paige, Lindsay Alaimo, and Matthew Geiger have made the CCHS meteorology program a priority in their weekly schedule, opening up studio time, providing equipment and resources, and helping to “run the show”. Due to their efforts, it has not only been a wonderful educational opportunity for the students, but a very professional experience.

9. REFERENCES

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