A Component of the Washington State Assessment System



Educational Technology

Weather Patterns and Predictions Grades K-2

Assessment

Office of Superintendent of Public Instruction



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Overview

Introduction

This document contains information which is essential to the administration of the OSPI-Developed assessment for educational technology. This assessment is an ideal way for students to demonstrate their proficiency with research and communication skills as they investigate weather patterns and predictions. Developed by teachers in Washington State, the assessment is designed to measure learning of selected standards for educational technology.

Description of the OSPI-Developed Assessment

This assessment models best practices of instruction, including the use of technology, lesson cycle, differentiation, and student-centered learning. In addition, teachers will be able to collect and use formative and summative evidence regarding student performance on weather patterns and predictions, and educational technology standards.

Students will complete the assessment by responding to a prompt that requires the use of educational technology. During the assessment, students will document their ability to organize information and analyze data, then produce a response to the original prompt. Teachers will score the final product using the Educational Technology Scoring Guide.

Using the Assessment

The rubric for this educational technology assessment is structured distinctively in that it **combines a checklist and a performance scale**. The Sample Unit Plan and individual Session Plans describe the basic materials and time needed to complete the assessment. Teachers will need to develop their own scoring tools to evaluate student work for additional content area standards.

Teachers should allow any student working productively on the assessment to continue. Session Plans provide some accommodations that differentiate the instruction or assessment based on the needs of students. Teachers should enable specific accommodations for ELL students, such as access to a paraprofessional, during the assessment. Any students who have an Individualized Education Plan (IEP) should have access to all accommodations required by the students' IEP.

For More Information

Please visit the OSPI Web site for additional resources for the educational technology assessments (<u>http://www.k12.wa.us/EdTech</u>).

This integrated assessment for global issues and educational technology asks students to collect and organize information about weather patterns and predictions. They will use this information to **create graphs and look for trends**. As students complete the task, they will communicate their solution in a digital format. Teachers can use this assessment to evaluate what students know and can do with educational technology.

The educational technology assessment is divided into two parts. The first four sessions of the suggested Unit Plan help students to build background knowledge. Teachers can use these sessions to collect and provide formative feedback to students. During the final session, students will create the product associated with the summative assessment for the educational technology standards.

Educational Technology Standards in the Primary Classroom

At the primary grade levels, some standards for educational technology include the words "with assistance" or "as a class." This can be challenging for teachers to interpret when trying to measure individual student progress toward the standards. In this assessment, we recommend that **students complete as much of the work as possible**. When the development of class notes or a class graph takes place, allow every student an opportunity to contribute an idea (that you can type for them) or total and input a data point (that you will use to create the graph). Use a class list or record-keeping tool to check off students as they collaborate during whole-class activities.

This assessment offers an opportunity for teachers to develop their proficiency with the following National Educational Technology Standards for Teachers (NETS·T):

- 2a: Design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity.
- 2d: Provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching.
- **4a**: Advocate, model, and teach safe, legal, and ethical use of digital information and technology, including respect for copyright, intellectual property, and the appropriate documentation of sources.

For more information on the NETS for Teachers, please visit <u>http://www.iste.org/standards/nets-for-teachers.aspx</u>.

This integrated assessment addresses the following standards:

Standards				
Educationa	l Technology			
1.1.1 Generate ideas and create original works for pers	onal and group expression using a variety of digital tools.			
 Organize ideas and produce digital products 	with assistance.			
1.1.2 Use models and simulations to explore systems, i	dentify trends and forecast possibilities.			
 Use interactive resources to practice skills, et 	xplore new concepts and describe patterns.			
1.2.1 Communicate and collaborate to learn with other	S.			
 Participate in online projects as a class. 				
 Work with others using technology tools to c 	convey ideas or illustrate simple concepts.			
Science	Math			
NGSS	CCSS Math			
K-ESS2-1 . Use and share observations of local weather	Measurement and Data 4: Represent and interpret data.			
conditions to describe patterns over time				
English Language Arts				
CCSS ELA				
Writing 6 ($K - 2$): With guidance and support from adults, use a variety of digital tools to produce and publish				
writing, including in collaboration with peers.				
Writing 7: Participate in shared research and writing projects.				

Student Task

As a weather forecaster, your job is to inform the community about future weather conditions. This information is important because many plans may be influenced by weather events. For example, people need to know what to wear so they can be dressed appropriately for the day's weather. Others might depend on a weather forecast to plan—farmers for planting crops, sports teams for games, cities for snow plowing and others for swimming.

Residents in your town noticed that previous forecasts were not very accurate. They hired you to find out what information town residents need, how to measure it, and then report back with a correct forecast. The town is counting on you to explain how you are making your predictions using data. They also need you to develop the forecast in a digital format (for example, podcast or document) so that the information can easily be shared.

Grades K-2 Weather Patterns and Predictions Educational Technology Scoring Guide

Directions: Each of the *attribute names* below represents part of an educational technology standard. These are followed by *descriptions* of student performance which meet the standard. If the student work provides evidence of meeting the standard, it earns the *points* shown in the final column. Total the points and then compare to the *Scoring Rubric* to determine the overall level of performance.

We use the term *digital* to refer to tools and information that do not exist in a physical form. Computer software, Web sites, online databases, pod/vodcasts and pages from an eReader are just a few examples.

Attributes of Educational Technology Standards				
GLE	Attribute Name	Description	Points	
	Organize Ideas	Uses a graphic organizer (for example, calendar, timeline, table) to record data accurately.	1	
Organize Ideas 1.1.1 Create Original Works		Uses categories to correctly label data and information. For example, days of the week, symbols to label high/low temperatures, or amount of rainfall.	1	
		Inputs data, with assistance, into a class graph using a digital tool.	1	
	•	Develops a digital product (for example, audio recording, document, or annotated graph), with assistance, which communicates a weather forecast.	1	
	Describe Patterns	Uses the graph to identify a pattern.	1	
1.1.2	Forecast Possibilities	Makes a prediction using information from the graph. For example, "Based on my graph, I think the high temperature will decrease after today."	1	
1.2.1	Collaborates to	Participates in group data collection activities.	1	
1.2.1	Learn	Takes turns in group discussion or activities.	1	
TOTA	L		8	

Attributes of Educational Technology Standards

Scoring Rubric for Weather Patterns and Predictions: Educational Technology

Performance Description	Points
A Level 3 response exceeds the standards and reflects that a student can demonstrate knowledge and ability beyond the requirements for Educational Technology GLEs 1.1.1, 1.1.2, and 1.2.1.	7-8
A Level 2 response meets the standards and reflects that a student understands and is able to perform GLE 1.1.1 <i>Generate ideas and create original works for personal and group expression using a variety of digital tools</i> , GLE 1.1.2 <i>Use models and simulations to explore systems, identify trends and forecast possibilities</i> , and GLE 1.2.1 <i>Communicate and collaborate to learn with others</i> BY using technology to create a graph that demonstrates weather patterns over a period of time and that the student can analyze to identify weather trends and make predictions based on the data.	5-6
A Level 1 response reflects that a student is still working toward meeting GLEs 1.1.1, 1.1.2, and 1.2.1.	0-4

The Sample Unit Plan shown represents only one of many ways teachers could use this integrated assessment. This assessment does not require use of the plan or the sessions that follow, however teachers may find the structure useful. Specific ideas for each of the sessions follow the Sample Unit Plan.

Teachers must use the student task and scoring guide as written. Teachers can adapt the amount of instruction, time considerations, and resources for individual classroom use.

Sample Unit Plan				
Session	Standards	Time	Preparation and Materials	
1 Make Observations	ET 1.1.1 ET 1.2.1 NGSS K- ESS2-1 CCSS Math Data 4	30 minutes + time for daily data gathering	 Computer with Internet access connected to LCD projector Tools for measuring weather conditions (for example, thermometer, rain gauge, compass) Weather forecast (video or audio). See the <u>Resources</u> for suggestions. Optional Document camera or interactive whiteboard Sources for weather data gathering (for example, Web sites or local newspaper) Use common materials to make more sophisticated measurementsbarometer for air pressure, hygrometer for humidity, or anemometer for wind speed. Find instructions to make your own weather station here: <u>http://sln.fi.edu/weather/todo/todo.html</u>. 	
2 Organize Data	ET 1.1.1 ET 1.2.1	45 minutes	 Computers or devices for student use. Unifix cubes, counters, or other manipulatives Optional: Document camera Interactive whiteboard Digital camera Trade books, such as Lemonade for Sale by Stuart J. Murphy and Tricia Tusa or The Great Graph Contest by Loreen Leedy 	
<u>3</u> Analyze Information	ET 1.1.1 ET 1.1.2	60 minutes	 <u>Digital tool for graphing</u>—graphing Web site or spreadsheet program (for example, Excel). Printer Graph from Session Two 	
4 Create a Forecast	All	60 minutes	Computers or devices for student use.	

Session One: Make Observations

Background

In this session, students are introduced to the assessment task as they consider ways in which the weather impacts their lives and the usefulness of having a forecast. They begin to engage with Science Standards as they describe the parts of a weather forecast. Finally, students develop knowledge and skill with Educational Technology Standard 1.1.1 and 1.2.1, and the other Science and Mathematics Standards as they collaborate to use tools to measure, describe, and record weather data.

Students begin to use a graphic organizer, then continue to add information about weather conditions for one week. They will use this information to create graphs, look for patterns and trends, and make predictions for the final product.

	□ Identify and coordinate with teacher-librarian or technology specialist to ensure that you have			
	access to the computers/tools you need to facilitate the unit.			
	□ Choose at least three weather conditions you will have students measure and record			
	throughout the assessment. For example, collect data about current temperature, high/low			
	temperature, rainfall, wind direction or speed, humidity, sky conditions, or air pressure. You			
Prep	may use a Web site, video forecast, or local newspaper to supplement student observations and			
-	measurements. You could also skype or email with an expert from an area college or			
	university.			
	□ Select a graphic organizer that students will use to record weather information. For example, a			
	calendar, timeline, table, or spreadsheet.			
	Review district <u>policies</u> on Acceptable Use of technology and Digital Citizenship.			
	Computer with Internet access connected to LCD projector			
	Tools for measuring weather conditions (for example, thermometer, rain gauge, compass)			
	□ Weather forecast (video or audio). See the <u>Resources</u> for suggestions.			
Materials	Optional			
Waterials	Document camera or interactive whiteboard			
	□ Sources for weather data gathering (for example, Web sites or local newspaper)			
	Use common materials to make more sophisticated measurementsbarometer for air pressure,			
	hygrometer for humidity, or anemometer for wind speed. Find instructions to make your own			
	weather station here: http://sln.fi.edu/weather/todo/todo.html.			

Session	n One: Make Observations
	Plan (30 minutes + time each day to record weather information)
Engage	 Have students look around the classroom. Ask: What do you see that tells you what the weather is like outside? Answers might include observations of what peers are wearing, the classroom calendar, coat rack, or other materials. Then ask: Would you have seen the same kinds of things yesterday? What types of things might we see in the classroom tomorrow that will tell us about the weather? Extend the class discussion and prompt student background knowledge by asking students about recent weather patterns or predictions of upcoming seasonal weather that they may have heard in the news. Ask students: Why is it useful to know the weather forecast or current temperature? Have there been times that you have had to change plans with family or friends because of the weather? Share the student task for this assessment with the class.
Explore	 Show students a weather forecast from an area television station or have them listen to an audio version of a forecast from the radio or a podcast. Have students to pay attention to the parts of the forecast (for example, current temperature, high and low temperature, sky conditions). Record the list of information where students can see it. Then ask: <i>How do forecasters get this information? How could we make the same observations?</i> Students might suggest looking outside to see the cloud cover, using a thermometer to record the temperature, or using a rain gauge to collect and measure rainfall.
Explain	 Select the pieces of weather information students will track for at least the next week. Model how to use a graphic organizer to record weather information. Students will use their organizer to construct a class graphs, identify trends, and make predictions. If available, use historical weather data from the previous three days to use as a model for how to fill in the organizer. Have students fill in their own organizer. Show students how to make observations for the current date. For example, measure the current outside temperature and describe the sky conditions. You could also show students a Web site which lists other weather conditions.
Extend	 Ask students what predictions they have about tomorrow's weather. <i>Will it be the same as today? Why do you think so?</i> For at least five consecutive class days, set aside time for students to measure and record the weather conditions the class is tracking. You could choose to skip entering weekend or holiday information or use another source to fill in this information.
Evaluate	 After students have used the tools and collected data, ask them what would help make better observations. This should lead to a discussion about the kinds of tools used (for example, weather forecasters on television have access to more accurate devices). You could also have students compare the accuracy of tools, such as a thermometer, as opposed to observations, such as "It's hot today." Do not score this session as part of the assessment. Provide feedback to students about their ability to record information accurately in the graphic organizer.

Session Two: Organize Data

Background

During Session One, students measured and recorded weather data. They will use this information to respond to the Student Task. In this session, students will continue to build their skill with Educational Technology Standard 1.1.2 as they begin to look for a pattern. The organizational structure of the graph they create will help students clarify thinking about how the weather changes. Students will also practice their skills with Educational Technology Standard 1.2.1 as they collaborate to build graphs.

practice their skins with Educational Technology Standard 1.2.1 as they conadorate to build graphs.				
Prep	Select a method to build a graph with students, for example manipulatives or Unifix cubes.			
	Unifix cubes, counters, or other manipulatives			
	Optional:			
	• Document camera			
Materials	• Interactive whiteboard			
	Digital camera			
	• Trade books, such as Lemonade for Sale by Stuart J. Murphy and Tricia Tusa or The Great			
	Graph Contest by Loreen Leedy			
Learning l	Plan (45 minutes)			
	 Review the purpose of the Student Task and restate the learning targets with students. 			
	 Review the data that students have collected and how it is organized. Ask students: 			
	What patterns do you see?			
Engage	What could we do with this information to understand it better?			
	 How could we show this information in a different way? 			
	 You might need to prompt or direct younger students to think about making a picture (graph) 			
	that uses the data.			
	• Choose one of the sets of classroom data (for example, high temperature). Use unifix cubes or			
	other manipulatives and a document camera (or sticky notes on a board) to build a model of the			
Explore	data points as students read information from their graphic organizer.			
	 Then, ask students to identify any pattern they see. What do they think might happen to the 			
	pattern next?			
	• Repeat the process of using the manipulatives to build a graph for another set of weather data.			
	Allow students to work in pairs at their desks as they use manipulatives to build their own			
	versions of the graph. Ask students:			
	• <i>What is the main idea of the graph?</i> (For example, how the amount of rainfall changed over			
	five days.)			
Extend	• What pattern or trend can you see? (For example, first there was no rain and by the end			
	there was a lot of rain.)			
	• If you used the document camera, remember to take a picture of the graph for Session Three.			
	You could also suggest that students use a digital camera to take a picture of their analog			
	graphs.			
	Optional			
	• Read a trade book, such as <i>Lemonade for Sale</i> , with students to practice graph analysis skills.			
	• Review the <u>Student Checklist</u> . Ask students to identify the skills and abilities they were			
Evaluate	developing during today's lesson or where they might need more practice.			
	 Do not score this session as part of the assessment— use as formative evaluation only. 			
	 Provide feedback to students on their skill using the graph to identify a pattern. 			

Session Three: Find Patterns

Background

In Session Two, the class constructed an analog version of the some weather data. During Session Three, students will extend their work as they work with others to use a digital tool to organize information and describe patterns (GLEs 1.1.1 and 1.1.2).

This is the final formative session for the assessment. Students will apply the skills developed during the first three sessions to their final product.

		Review how to create a graph using an online tool or spreadsheet program.
Prep		Select one or two examples of graphs from Web sites or print materials to share and discuss
-		with students.
		Digital tool for graphing—graphing Web site or spreadsheet program (for example, Excel).
Materials		Printer
		Graph from Session Two.
Learning I	Plan	(60 minutes)
	•	Show students a graph you selected from the Web or a print source. Use the graph with students
		to identify patterns. Ask students:
Engago		What can you summarize from the graph?
Engage		What pattern(s) do you notice?
	-	Review the graph and information from the previous session. Tell students that during today's
		session, they will work together to make the graph on the computer.
	-	Develop a digital graph with the class.
		• Model how to enter data into a table.
		• Assign students a partner and a column of data from the attendance sheet.
Explore		• Have students total the column, then enter the number into the table.
Explore		• After students input their information into the table, model how to convert the data into a
		graph. Math standards for primary students target bar graphs, but you can create a line
		graph to see a trend in the data more easily.
		• Show students how to save or print the graph.
	-	Provide student pairs with time to review the graph generated by the class during Session
Extend		Three. They should prepare to share their ideas with the class:
Extenu		How does the shape of the graph of help us to identify a pattern?
		How can we use this information to make a prediction about the weather?
	-	Debrief with the class about using the digital tool.
		 What did they like or want to change about the digital tool?
		• What helpful suggestions can they give to others who are having problems using the tool?
Evaluate	-	Review the Student Checklist. Ask students to identify the skills and abilities they were
		developing during today's lesson or where they might need more practice.
	-	Do not score this session as part of the assessment— use as formative evaluation only. Provide
		feedback to students on their ability to use the graph to identify a pattern.

Session Four: Create a Forecast

Background

Session Four represents the summative component for this assessment. Until now, students have had practice with measuring and describing weather, as well as collaborating to organize information and describe patterns (Educational Technology Standards 1.1.1, 1.1.2, and 1.2.1). During this final session, each student will create a weather forecast based on the information they collected and discussed as a class.

Group products are not permissible for the summative assessment. However, teacher assistance to complete the task is acceptable.

Prep	Select the digital format(s) for the student weather forecast. Choose a format familiar to students. Possible formats an audio recording or podcast, document, PowerPoint or similar presentation, or a blog post. You could also template the format that you want students to use. See the Resources for further information and ideas.
Materials	Computers or devices for student use.
Learning	Plan (60 minutes)
Engage	 Review the student task for this assessment with students. You could show another weather forecast to students or the list of weather forecast parts they generated during Session One. Review the data collected by students during this assessment.
Explain	 Guide students through the process of organizing their information for the final product. What weather information should they include with their forecast? Which graphs should they show or describe? (Use questions from Session Three as a guide.) How far into the future should they make their predictions? What format should they use for the forecast?
	• Review the format(s) students can use to create their digital product. For example, show which buttons to push to record, stop, and send an audio message. Or, show students how to embed a graph into a document.
	Students create their response to the original prompt for this assessment. Provide assistance as needed.Be sure that students know where to save their work.
Extend	 Teaching Tips and Accommodations If you have only one or two student computers in class, assign computer time to each student so they can develop their product. If you plan to have students do an audio recording, borrow a headset with microphone or use another USB microphone to help amplify and capture student voices.
Evaluate	Have students submit their work to a designated location.Score students' work using the Scoring Guide for Educational Technology.
Extend	 Optional Continue to gather data over a longer period of time to determine if their predictions are accurate or analyze longer term weather patterns. You could also consider watching a television forecast to see whether or not students agree. If you completed this assessment in the fall, revisit graphing and weather predictions in the spring to make observations about the weather over time. Retain the collected data and use them in subsequent years with future classes to analyze
	longer term trends in weather patterns.

Name _____

Student Task

As a weather forecaster, your job is to inform the community about future weather conditions. This information is important because many plans may be influenced by weather events. For example, people need to know what to wear so they can be dressed appropriately for the day's weather. Others might depend on a weather forecast to plan—farmers for planting crops, sports teams for games, cities for snow plowing and others for swimming.

Residents in your town noticed that previous forecasts were not very accurate. They hired you to find out what information town residents need, how to measure it, and then report back with a correct forecast. The town is counting on you to explain how you are making your predictions using data. They also need you to develop the forecast in a digital format (for example, podcast or document) so that the information can easily be shared.

Description	Checklist	How do I know?
I organize and record data accurately.		
I use categories to label my data.		
I help to make a graph on the computer.		
I make a letter or recording using a computer.		
I use the graph to find a pattern.		
I make a prediction using my graph.		
I help collect weather data for the class.		
I take my turn to share my ideas.		

Posting Photos and Student Work Parental Permission Form

Parental Consent Form

In Washington State's K-12 schools, email, blogs, podcasts, collaborative document sites, such as GoogleDocs, and multimedia items that publish to school and class Web sites, have become an integral part of education, administration and communication with the community.

As educators, we are committed to practices that promote student safety and privacy of information online and offline. We approach communication software and hardware, which allow students to connect with peers, experts and educators as important tools for student learning.

Given that web-based communication requires an online presence—not always anonymous—we ask parents and students to consider carefully the **acceptable level of access and participation** your student will have using digital tools at school.

These three statements summarize _______ school's policy related to the privacy of student content.

- Publishing photos of students or samples of student work promotes an opportunity to share and learn with others. It is acceptable to publish images of students and student learning products on school Web pages without information that would identify the student. Parents/guardians must provide written consent to publish their child's photo or school work on any school-related Web site before the item is published.
- 2. All students and teachers must abide by the copyright laws of the United States.
- 3. All student files, created and stored on the school district's network, are the property of the school district. As district property, all files and multimedia items are open to the review and evaluation of district officials.

Permission

As a parent or legal guardian of, _______, I have read and understand the policy statement related to the posting of images of students and student work online.

I consent to the permission(s) I have initialed below:

 I grant permission for the publication of my student's photo or work without information that
would identify the student.

_____ I grant permission for my student to use online tools provided by the teacher.

I grant permission for my student to use a personal email account for assignments while at school.

Student Name (Print): _____

Student Signature:	Date:		
Parent (Guardian) Signature:		Date:	

Posting Photos and Student Work Parental Permission Form

Educational Technology Resources			
Digital Tools			
Description		Location	
Graphing Tools	With Create a Graph , students input their data and labels, then select a graph that can be downloaded. No login is required.	http://nces.ed.gov/nceskids/createagraph/	
	The Online Chart Tool allows students to generate and download a variety of graphs once they input their data and labels. No login is required.	http://www.onlinecharttool.com/	
Publish	You can use Glogster to develop an interactive poster.	http://edu.glogster.com/	
	Animoto has educational accounts. Students can upload pictures, add text and music, and generate a presentation.	http://animoto.com/	
	With a Voicethread account, students are able to share documents, images, and videos with others.	http://voicethread.com/	
	Students can create posts for a classroom blog . Here are examples of education-friendly sites, but there are others.	http://edublogs.org/ http://kidblog.org/home.php	
	Wikis are Web sites that are easy to create and edit. Many services offer free wikis for educators.	http://www.wikispaces.com/ http://pbworks.com/	
	Record mp3 allows students to record audio and then download or send it to their teacher or other account.	http://www.recordmp3.org/	
Resources			
Description		Location	
An online tutorial is available for the Create a Graph tool. You can also download it as a PDF.		http://nces.ed.gov/nceskids/help/user_guide/graph/index.asp	
The National Oceanographic and Atmospheric Administration provides historical weather data and current forecasts.		http://www.weather.gov/	
You can find weather data and regional forecasts in video format on The Weather Channel Web site.		http://www.weather.com	

Posting Photos and Student Work Parental Permission Form

Educational Technology Resources		
Videos		
Description	Location	
A tutorial for Create a Graph	http://www.youtube.com/watch?v=YfgUwEGgHEA	
A tutorial for the Online Chart Tool	http://www.screentoaster.com/watch/stUEpdQkNLRFtYQF IUX1tfVFVW/online_chart_tool	
How to create a chart in Excel 2007	http://office.microsoft.com/en-us/excel-help/charts-i-how- to-create-a-chart-in-excel-2007-RZ010175754.aspx	
Different ways to plot data in worksheet in Excel 2003	http://office.microsoft.com/en-us/excel-help/demo- different-ways-to-plot-worksheet-data-in-a-chart- HA001161827.aspx	
Lesson Plans		
Description	Location	
In Weather Watchers , students collect and analyze data about the weather and learn to make a stem-and-leaf plot.	http://illuminations.nctm.org/LessonDetail.aspx?ID=L287	
Students analyze information represented by pictographs during What's the Weather? Lesson prompts encourage students to discuss, describe, read, write, and make predictions about the graphs and the information they contain.	http://illuminations.nctm.org/LessonDetail.aspx?ID=L196	
How's the weather today? from National Geographic introduces students to weather and temperature trends in different latitudes of the United States.	http://www.nationalgeographic.com/xpeditions/lessons/07/g k2/weathertoday.html	
Policy Guidance		
Description	Location	
Children's Internet Protection Act (CIPA)	http://www.e-ratecentral.com/CIPA/default.asp	
Children's Online Privacy Protection Act (COPPA)	http://www.coppa.org/comply.htm	
Family Educational Rights and Privacy Act (FERPA)	http://www2.ed.gov/policy/gen/guid/fpco/ferpa/index.html	