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MazeGame Lesson Plan

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Generic Lesson Plan Template

You should submit this form in addition to any computer generated files/documents/models to your group folder on Angel. Please create a .zip file and upload the group of files as a single archive.

Name: Liz Helbig-Watkins
Grade level(s)/Subject taught: Math A
Objectives: Review plotting points and to use the distance formula to calculate the shortest distance.

Please provide a rich **one-page, single-spaced**, description or a *vision* of your best thinking on a way or ways you might teach the planned lesson. (approximately $\frac{1}{2}$ page for the teacher role, $\frac{1}{2}$ page for the student role). Also, construct a tentative rubric that you might use with your students (see example)

Items to include in your lesson plan: (Choose your discipline/concepts from your own area).

1. Write the Mathematical Concept or "key idea" that modeling will be used to teach: (e.g. Students use mathematical modeling/ multiple representation to provide a means of presenting, interpreting, communicating, and connecting mathematical information and relationships)

The students will use mathematical modeling/multiple representation to understand patterns, relations and functions, along with relating the distance between two points to the coordinate plane.

and/or...

- 1b. Write the Science Concept or "key idea" that modeling will be used to teach: (e.g. Organisms maintain a dynamic equilibrium that sustains life).

Materials:

- The students will need to be able to access the internet to get to the project interactive site and the Maze Game activity.
- Worksheet on the Maze Game
- Calculator

“...a rich **one-page, single-spaced**, description or a *vision* of your best thinking...”

Prompts:

1. How will you assess the prior knowledge of the student?
2. How will you begin the lesson?
3. What are the teacher and students doing every 5-10 minutes? (Teacher Actions and Student Actions)
4. How will you assess the learning for the lesson?

Using _____ I plan on having my students...
(software / modeling package(s))

Day 1 (45 minutes)

In this lesson I am going to use the project interactive site and the Maze Game to review the concept of plotting points and to find the distance across the Mine Field.

I am going to start the lesson by having the students pretend that they are in the Armed Forces and are fighting in the War in Iraq. I will give the following introduction: “ The mission you are on today requires you to cross a mine field and every move you make is crucial to your survival and the success of the mission. You will be given several maps that show you where the mines are located. These maps are coordinate planes and the location of the mines will be plotted on them. It is imperative to the mission that everyone knows about the coordinate plane and how to plot points on it. “ I will then ask a series of questions about the coordinate plane which reviews the axes, how to name a coordinate and how to plot a coordinate. As we discuss the information I will write down notes for reference. This should take about 5 minutes.

I will then show the students how to get to the website and the Maze Game. I will discuss with them the rules of the Maze Game and play a game or two with them as a group. I will model a 10 and 15 mine game with them. At this point I will pass out the worksheet and have them do the first part by themselves. As they are working on this I will circulate around the room and check for understanding. This should take about 15 minutes.

As we move to the second part of the lesson, I will explain that in their mission time is of the essence. This means they will need to find the shortest distance across the maze. “How will you calculate the distance across the field?” I will make sure they understand how to calculate vertical and horizontal distance on a coordinate grid then I will discuss with them the issue of how to calculate the diagonal distance. We will then discuss the distance formula and how it was derived based on the Pythagorean theorem. The students will then write the distance formula in their notebook. We will do some examples on finding the distance between two points in their notebooks. The students will then do the second half of the worksheet. The teacher will walk around the room asking/answering questions to check for understanding. This should take about 20 minutes.

The teacher will then review the days lesson by giving two points and asking the students to find the distance between the points as the ticket out the door.

Homework given will be questions out of the book on finding the distance between two points. This should take about 5 minutes.

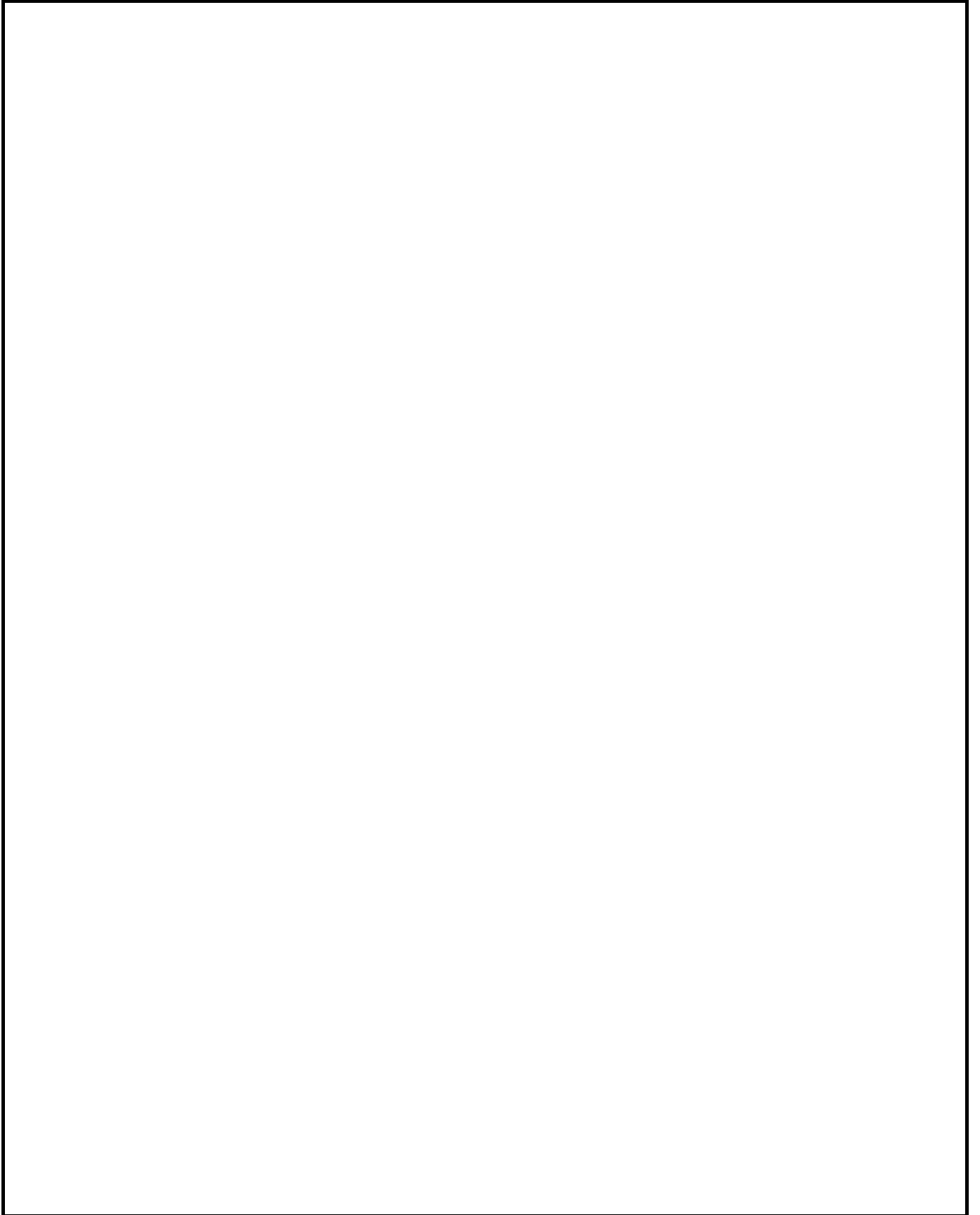
Day 2 (45 minutes)

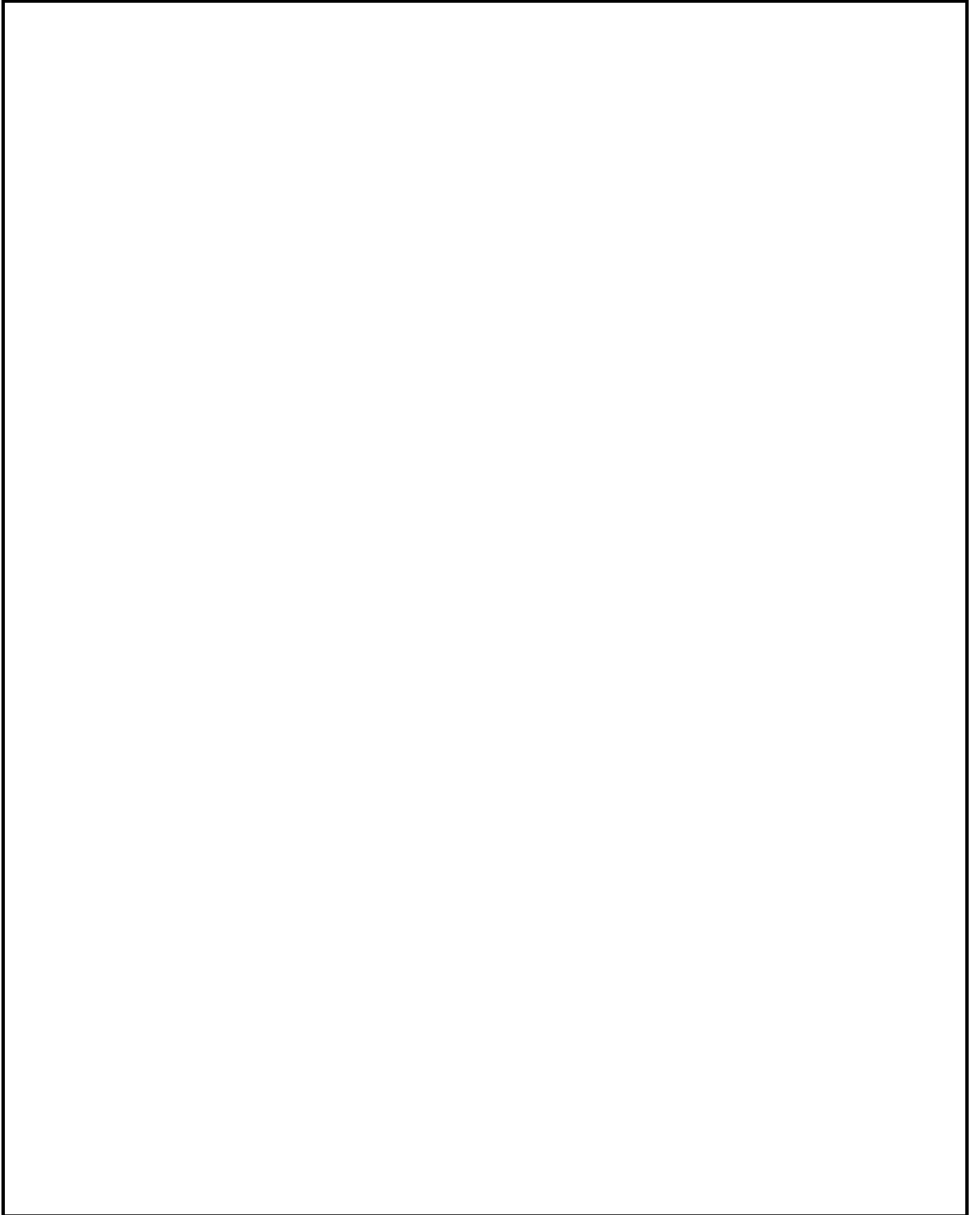
At the beginning of class review the distance formula learned yesterday. Go over homework. Say to the class, “ Yesterday we pretended that we were fighting over in Iraq. We are going to continue with our mission of crossing the mine fields that we started yesterday. Since time is essential we need to find the shortest distance across the mine field. We are going to use the distance formula we learned yesterday to do this.”

At this point I will get the class to the Maze Game on the website and model for them what I want them to do. I will start with a game of 5 mines asking for students to tell me coordinates to get across. I will then record the coordinates we plotted to get across and calculate the distance from start to finish. We will then ,as a class, discuss if there was a shorter way to cross the same picture again using different points. Together we will calculate the new distance in their notes. Next we will do another example using 10 mines. Everyone will record the coordinates chosen by the class. Independently, they will calculate the distance across. I will go over the problem and then ask the students to go across the same picture but try to do it in a shorter distance. Each student will record their coordinates and then find the distance. Then as a class we will discuss.

This should take about 30 minutes.

The students will then work on the worksheet for about 10 minutes. I will walk around the room to monitor and assess student understanding. At this point I will then review what we did today and assign homework. For homework the students will have to finish the work sheet.





****Example:** "I was thinking about beginning the class on [modeling X] by using the overhead to ask students what they know about X. From this brainstorming session, I might ask them to get into groups and discuss one or more of the ideas they gave me. After about ten minutes, I would have the students give their ideas on X and write them down on a transparency so they would be able to see them for the entire hour. From here, I would provide a 10 to 15 minute demonstration of the basics of using _____ modeling software. I would use an conceptual example that they would find familiar with such as getting a cold and how it is transmitted. From here, I would have students at the computer stations using a prepared guide or tutorial to get them started on basic software usage. I expect that in a short time a number of students would "catch on" rather quickly and be able to help others. By the third lesson, I suspect that most would be well on their way to development of their own or small group models using the _____ software. My plan of assessment would probably be a group model so they would gain more confidence in using the software in a meaningful way. After the second or third lesson, I would ask them to choose from a list of thematic or topic areas that fit the software nice and develop a model using the technology. As a product, I may have partners share their model and describe to other small groups how it works. The rubric I design would be general at first so that I might see what kinds of the products the student were capable of creating. From the prototypes, I would hone my rubric to make the modeling product as challenging as possible without making it too difficult." Etc...