

Lesson Title	Lesson 8 – Flood Management Scenario
Time	2 - 50 min class period
Resources	<ul style="list-style-type: none"> • Flood Management Scenario Worksheet
Objective	SWBAT generate a flood management plan that explains how a river interacts with the land surrounding it.
Standard	HS-ESS2-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.
Plan	<ul style="list-style-type: none"> • Students will be given a scenario where they will generate a response as a city engineer to a developer wanting to build a housing development south of Fargo in Forest River Park. They will be given a map of the river and precipitation data from the year. • Students will work in groups to create a presentation to the city on whether or not they approve this project. • The presentation must include: <ul style="list-style-type: none"> o A map of the river with labels o A discussion on the direction the river is flowing as well as where the thalweg is located o A discussion on whether this area could flood with supporting data from the river anatomy and precipitation table o Flood risk management strategies that would be required if this area was developed • Student will record their presentation as if they were presenting to the city with their conclusions.
Authors	Amanda Oanes and Jill Wold – West Fargo Public Schools
Acknowledgements	The curriculum was developed under National Science Foundation RET grant #1953102. However, these contents do not necessarily represent the policies of the National Science Foundation, and you should not assume endorsement by the federal government.



Rubric:

Criteria	4	3	2	1
River Description	The map is in the power point with labels on the river as well as the direction the river is flowing	Map is missing one component	Map is missing two components	Map is not labeled
Building Decision	Group has decided if building should or should not happen in this area, with sound reasoning	Group has decided, but reasons are not stated clearly	Group has decided, but no reasons are given	Group does not make a definitive answer
Flood Causes	Group discusses the causes of flooding and predicts if there will be a flood this spring in the new development	Group is missing either some of the factors that cause a flood OR does not make a prediction	Group is missing some factors of what causes a flood AND does not make a prediction	Flood causes are unclear
Flood Mitigation	Group discusses plans to prevent flooding in this development	Mitigation plan is missing one component	Mitigation plan is missing two components	Mitigation plan is unclear
Teamwork	Each person contributed to the research, planning, and creating the presentation. You divided up the work AND came together to talk about how each person contributed to the presentation	Team members divided up the work, and worked on their part, but did NOT come back together to talk about how each part contributed to the whole project	Team members expressed frustration AND team did not come together to talk about how each part worked to answer the question	Team members did not work together. Collaboration was not witnessed.
Presentation	Each person's voice is heard in the recording. The presentation makes sense and flows well without pauses	One voice is missing OR the presentation was choppy	One voice is missing AND the presentation was choppy	More than one voice is missing
TOTAL				/24



Flood Management Scenario - 15 years later...

You are a team of engineers working for the city of Fargo. The last 15 years has been very dry with the Red River flowing at a minimum level. Now, construction contractors want to build houses along the Red River, in a new development they want to call Forest River Park Development that is south of town near 88th Ave South. The contractors believe this is valuable wasted land. They also feel that homeowners will want to buy the lots that have a view of the river and will pay a premium price. They have come to the city with a proposal to build houses along the northside of the river. The city planning board is on board with this proposal. The map is shown below with the Forest River Park area labeled.



You need to go to the city planning board meeting with a presentation explaining what the best course of action should be for the city of Fargo. It is February and there has been above average rainfall since June, which is shown in the table below.

Monthly Total Precipitation for Fargo, ND

Year	Oct	Nov	Dec	Jan	Feb	Mar	April	Season
1997	2.41	2.38	1.27	1.79	0.59	1.89	3.12	13.45
2009	4.46	1.13	1.80	0.55	1.29	4.62	0.81	14.66
2036	4.62	1.47	2.16	1.33	1.58			

Directions: Your group will put together a presentation with the following information. You will record your presentation and explain your information.

Your presentation must include the following:

- The above map of the Red River showing the direction the river is flowing as well as where the fastest flowing part of the river is located.
- An explanation on why or why not this land should be developed. Your reasoning should include terms such as meander, cutbank, point bar, erosion, and deposition.
- A prediction on what you think will happen next spring if the precipitation follows the previous pattern. What factors could influence flooding along the Red River this year?
- Flood mitigation strategies that would be necessary if to prevent flooding in the building area.
- Each team member is expected to work on this project. Each person should be heard on the presentation. The presentation should be easy to follow and make sense, in other words, practice your presentation a couple of times before you record it!

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