Name:_____ Date:_____

Alaskan Farms on the Table

Alaska FFA Association and USDA Northwest Climate Hub

Grade Levels 6-12

Adapted from USDA Southwest Climate Hub "Farms on the Table Lesson Plan"

Step 1 Directions: choose **one** of the regions from table 1 to be the location for your new farm and **circle it**.

Table 1. Farm locations and data: 2021 values are averages, and 2070 values are predicted changes

Circle one region:		MAT-SU VALLEY	WESTERN KENAI	COPPER RIVER	FAIRBANKS	NENANA
TEMPERATURE	2021 (°F)	28.9	33.6	26.5	27.3	25.5
	2070 (°F)	+8	+8	+8	+10	+10
PRECIPITATION	2021(in.)	33.55	56.3	73.56	17.54	17.5
	2070 (in.)	+10%	+10%	+10%	+15%	+15%
AVERAGE FARM SIZE IN ALASKA		98 Acres	121 Acres	98 Acres	372 Acres	372 Acres
COMMON CROPS		hay, potatoes, carrots, beets, cabbage, broccoli, melons	hay, onions, carrots, potatoes	hay, potatoes, carrots, cabbage	barley, hay, potatoes, carrots	hay, potatoes, carrots

Weather data source: https://www.ncdc.noaa.gov/cag
Crop data source: https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Alaska/index.php

Step 2 Directions: customize your new farm by choosing **as many, or as few,** as you would like of the climate-mitigating adaptations from table 2. Place a checkmark under each adaptation that you choose, and write the cost (points) in the last column for each selected adaptation.

Table 2. Climate-mitigating adaptations

ADAPTATION	PROS	CONS	COST (POINTS)	CHOSEN COSTS
NO-TILL PLANTING ☐	-Reduces costs of labor, equipment, fuel -Reduces soil erosion from water and wind -Retains soil moisture -Increases soil organic matter -Limits soil compaction	-May require more herbicide and fungicide due to higher soil moisture -High upfront cost	**15**	
HEDGEROWS ☐	-Reduce soil erosion from water and wind -Create pollinator habitat -Prevent spread of some insects and fungal diseases	-Require some watering and maintenance -Possibly reduce number of crop rows	**5**	
WATER CISTERN COLLECTION & STORAGE UNIT ☐	-Collects rainfall and/or other water runoff for use when water is scarce	-Requires space -Can take a few years to collect enough water	**10**	
SOIL MOISTURE MONITORING ☐	-Decreases irrigation expenses by eliminating unnecessary watering of crops	-Requires labor to operate equipment	**3**	
BEEHIVES & FLOWER STRIPS ☐	-Reliable pollination of crops -Provide habitat for variety of pollinators	-Requires some maintenance -Unable to use insecticides	**5**	
			TOTAL COST (POINTS)	

STARTING OUTPUT FACTOR = 100 - _____ = _____

FARMS ON THE TABLE GAME DIRECTIONS

1. Your goal is to keep your farm in the black. Being in the black means that you are making money and being in the red means that you are losing money.
2. Choose at least two of the practices and treatments from the table for each year and write the cost of each selected item in the Chosen Costs column of the table.
3. Add up the cost of your practices and treatments and write the Total Cost at the bottom of the table.
4. Roll the die and assign the number rolled to your first selection; write it in the last column of the table. Roll the die again and assign that number to the second checked item and repeat this for all selected items.
5. Your instructor will then reveal the weather for the year and whether each of the practices and treatments were positive or negative investments. In the table, assign a plus sign to the die roll numbers of the positive investments and a minus sign to the die roll numbers of the negative investments.
6. Add up the positive and negative die roll numbers. Be sure to pay attention to the sign.
7. Fill in the equation at the bottom of each page and calculate the Starting Output Factor.

YEAR 1 **Starting Output Factor (from Page 2): _____**

Choose at least two practices and/or treatments

PLANTING PRACTICES	DESCRIPTION	COST (POINTS)	CHOSEN COSTS	+/-	DIE ROLL
DROUGHT RESISTANT CROP VARIETY ☐	Can produce a more reliable yield per acre during periods of prolonged drought, but seeds need to be purchased every year	2			
FLOOD RESISTANT CROP VARIETY ☐	Can tolerate being submerged for longer periods of time or multiple times per year, but seeds need to be purchased every year	2			
INTERPLANTING ☐	Can reduce erosion, spread of pathogens, and need for crop treatments; there is less economic risk in case of a crop fail year	2			
CROP ROTATION ☐	Can improve soil health and reduce loss from pathogens due to host plants changing locations from year to year	2			
SPREAD SPACING OF ROWS ☐	Lower crop yield/acre, but can reduce the need for crop treatments	2			
CROP TREATMENTS	**DESCRIPTION**	**COST (POINTS)**	**CHOSEN COSTS**	**+/-**	**DIE ROLL**
FERTILIZING ☐	Can increase rate of growth but depletes soil fertility causing an annual reliance	2			
HERBICIDE ☐	Can reduce loss from plant pests but becomes less effective with continual use	2			
INSECTICIDE ☐	Can reduce loss from insect pests but will harm natural pollinators; should **NOT** choose if have beehives & flower strips	2			
FUNGICIDE ☐	Can reduce loss from fungal pathogens but needs to be applied before infection to be effective	2			
		TOTAL COST (POINTS)		OUTPUT CHANGE TOTAL	

Weather for this year (from instructor): _____

_____	-	_____	+	_____	+	_____	=	_____
Starting Output Factor		Total Cost		Output Change Total		Farm Adaptation Bonus		New Starting Output Factor

YEAR 2 **New Starting Output Factor (from the end of Year 1): _____**

Choose at least two practices and/or treatments

PLANTING PRACTICES	DESCRIPTION	COST (POINTS)	CHOSEN COSTS	+/-	DIE ROLL
DROUGHT RESISTANT CROP VARIETY ☐	Can produce a more reliable yield per acre during periods of prolonged drought, but seeds need to be purchased every year	2			
FLOOD RESISTANT CROP VARIETY ☐	Can tolerate being submerged for longer periods of time or multiple times per year, but seeds need to be purchased every year	2			
INTERPLANTING ☐	Can reduce erosion, spread of pathogens, and need for crop treatments; there is less economic risk in case of a crop fail year	2			
CROP ROTATION ☐	Can improve soil health and reduce loss from pathogens due to host plants changing locations from year to year	2			
SPREAD SPACING OF ROWS ☐	Lower crop yield/acre, but can reduce the need for crop treatments	2			
CROP TREATMENTS	**DESCRIPTION**	**COST (POINTS)**	**CHOSEN COSTS**	**+/-**	**DIE ROLL**
FERTILIZING ☐	Can increase rate of growth but depletes soil fertility causing an annual reliance	2			
HERBICIDE ☐	Can reduce loss from plant pests but becomes less effective with continual use	2			
INSECTICIDE ☐	Can reduce loss from insect pests but will harm natural pollinators; should **NOT** choose if have beehives & flower strips	2			
FUNGICIDE ☐	Can reduce loss from fungal pathogens but needs to be applied before infection to be effective	2			
		TOTAL COST (POINTS)		OUTPUT CHANGE TOTAL	

Weather for this year (from instructor): _____

_____	-	_____	+	_____	+	_____	=	_____
Starting Output Factor		Total Cost		Output Change Total		Farm Adaptation Bonus		New Starting Output Factor

YEAR 3 **New Starting Output Factor (from the end of Year 2): _____**

Choose at least two practices and/or treatments

PLANTING PRACTICES	DESCRIPTION	COST (POINTS)	CHOSEN COSTS	+/-	DIE ROLL
DROUGHT RESISTANT CROP VARIETY ☐	Can produce a more reliable yield per acre during periods of prolonged drought, but seeds need to be purchased every year	2			
FLOOD RESISTANT CROP VARIETY ☐	Can tolerate being submerged for longer periods of time or multiple times per year, but seeds need to be purchased every year	2			
INTERPLANTING ☐	Can reduce erosion, spread of pathogens, and need for crop treatments; there is less economic risk in case of a crop fail year	2			
CROP ROTATION ☐	Can improve soil health and reduce loss from pathogens due to host plants changing locations from year to year	2			
SPREAD SPACING OF ROWS ☐	Lower crop yield/acre, but can reduce the need for crop treatments	2			
CROP TREATMENTS	**DESCRIPTION**	**COST (POINTS)**	**CHOSEN COSTS**	**+/-**	**DIE ROLL**
FERTILIZING ☐	Can increase rate of growth but depletes soil fertility causing an annual reliance	2			
HERBICIDE ☐	Can reduce loss from plant pests but becomes less effective with continual use	2			
INSECTICIDE ☐	Can reduce loss from insect pests but will harm natural pollinators; should **NOT** choose if have beehives & flower strips	2			
FUNGICIDE ☐	Can reduce loss from fungal pathogens but needs to be applied before infection to be effective	2			
		TOTAL COST (POINTS)		OUTPUT CHANGE TOTAL	

Weather for this year (from instructor): _____

_____	-	_____	+	_____	+	_____	=	_____
Starting Output Factor		Total Cost		Output Change Total		Farm Adaptation Bonus		New Starting Output Factor

YEAR 4 **New Starting Output Factor (from the end of Year 3): _____**

Choose at least two practices and/or treatments

PLANTING PRACTICES	DESCRIPTION	COST (POINTS)	CHOSEN COSTS	+/-	DIE ROLL
DROUGHT RESISTANT CROP VARIETY ☐	Can produce a more reliable yield per acre during periods of prolonged drought, but seeds need to be purchased every year	2			
FLOOD RESISTANT CROP VARIETY ☐	Can tolerate being submerged for longer periods of time or multiple times per year, but seeds need to be purchased every year	2			
INTERPLANTING ☐	Can reduce erosion, spread of pathogens, and need for crop treatments; there is less economic risk in case of a crop fail year	2			
CROP ROTATION ☐	Can improve soil health and reduce loss from pathogens due to host plants changing locations from year to year	2			
SPREAD SPACING OF ROWS ☐	Lower crop yield/acre, but can reduce the need for crop treatments	2			
CROP TREATMENTS	**DESCRIPTION**	**COST (POINTS)**	**CHOSEN COSTS**	**+/-**	**DIE ROLL**
FERTILIZING ☐	Can increase rate of growth but depletes soil fertility causing an annual reliance	2			
HERBICIDE ☐	Can reduce loss from plant pests but becomes less effective with continual use	2			
INSECTICIDE ☐	Can reduce loss from insect pests but will harm natural pollinators; should **NOT** choose if have beehives & flower strips	2			
FUNGICIDE ☐	Can reduce loss from fungal pathogens but needs to be applied before infection to be effective	2			
		TOTAL COST (POINTS)		OUTPUT CHANGE TOTAL	

Weather for this year (from instructor): _____

_____	-	_____	+	_____	+	_____	=	_____
Starting Output Factor		Total Cost		Output Change Total		Farm Adaptation Bonus		New Starting Output Factor

YEAR 5 **New Starting Output Factor (from the end of Year 4): _____**

Choose at least two practices and/or treatments

PLANTING PRACTICES	DESCRIPTION	COST (POINTS)	CHOSEN COSTS	+/-	DIE ROLL
DROUGHT RESISTANT CROP VARIETY ☐	Can produce a more reliable yield per acre during periods of prolonged drought, but seeds need to be purchased every year	2			
FLOOD RESISTANT CROP VARIETY ☐	Can tolerate being submerged for longer periods of time or multiple times per year, but seeds need to be purchased every year	2			
INTERPLANTING ☐	Can reduce erosion, spread of pathogens, and need for crop treatments; there is less economic risk in case of a crop fail year	2			
CROP ROTATION ☐	Can improve soil health and reduce loss from pathogens due to host plants changing locations from year to year	2			
SPREAD SPACING OF ROWS ☐	Lower crop yield/acre, but can reduce the need for crop treatments	2			
CROP TREATMENTS	**DESCRIPTION**	**COST (POINTS)**	**CHOSEN COSTS**	**+/-**	**DIE ROLL**
FERTILIZING ☐	Can increase rate of growth but depletes soil fertility causing an annual reliance	2			
HERBICIDE ☐	Can reduce loss from plant pests but becomes less effective with continual use	2			
INSECTICIDE ☐	Can reduce loss from insect pests but will harm natural pollinators; should **NOT** choose if have beehives & flower strips	2			
FUNGICIDE ☐	Can reduce loss from fungal pathogens but needs to be applied before infection to be effective	2			
		TOTAL COST (POINTS)		OUTPUT CHANGE TOTAL	

Weather for this year (from instructor): _____

_____	-	_____	+	_____	+	_____	=	_____
Starting Output Factor		Total Cost		Output Change Total		Farm Adaptation Bonus		New Starting Output Factor

YEAR 6 **New Starting Output Factor (from the end of Year 5): _____**

Choose at least two practices and/or treatments

PLANTING PRACTICES	DESCRIPTION	COST (POINTS)	CHOSEN COSTS	+/-	DIE ROLL
DROUGHT RESISTANT CROP VARIETY ☐	Can produce a more reliable yield per acre during periods of prolonged drought, but seeds need to be purchased every year	2			
FLOOD RESISTANT CROP VARIETY ☐	Can tolerate being submerged for longer periods of time or multiple times per year, but seeds need to be purchased every year	2			
INTERPLANTING ☐	Can reduce erosion, spread of pathogens, and need for crop treatments; there is less economic risk in case of a crop fail year	2			
CROP ROTATION ☐	Can improve soil health and reduce loss from pathogens due to host plants changing locations from year to year	2			
SPREAD SPACING OF ROWS ☐	Lower crop yield/acre, but can reduce the need for crop treatments	2			
CROP TREATMENTS	**DESCRIPTION**	**COST (POINTS)**	**CHOSEN COSTS**	**+/-**	**DIE ROLL**
FERTILIZING ☐	Can increase rate of growth but depletes soil fertility causing an annual reliance	2			
HERBICIDE ☐	Can reduce loss from plant pests but becomes less effective with continual use	2			
INSECTICIDE ☐	Can reduce loss from insect pests but will harm natural pollinators; should **NOT** choose if have beehives & flower strips	2			
FUNGICIDE ☐	Can reduce loss from fungal pathogens but needs to be applied before infection to be effective	2			
		TOTAL COST (POINTS)		OUTPUT CHANGE TOTAL	

Weather for this year (from instructor): _____

_____	-	_____	+	_____	+	_____	=	_____
Starting Output Factor		Total Cost		Output Change Total		Farm Adaptation Bonus		New Starting Output Factor

RESULTS AND CONCLUSIONS

1. How many years were you able to keep your farm in the black? Did you end the game in the red or in the black?

2. Were there certain practices or treatments that seemed to be a positive investment more than others? Were there certain practices or treatments that seemed to be a negative investment more than others? Why do you think that is the case?

3. If you were to play this game again, what would you do differently? Why?