Expedition Simulation

Use the prompts below to guide students on a simulated expedition. Some of the prompts introduce challenges, so students will encounter problems and have to make quick decisions and revisions to their plans. Give groups time to record their decisions regarding each task on their Deep-Sea Expedition Project Proposal Plan. Have them record their decisions about how they will handle each challenge in a cascading consequences diagram before you read the next task or challenge. If students need guidance creating their diagram, write each task or challenge title on the board as a diagram item from which they should draw their decisions and subsequent consequences.

Create a dramatic signal, such as a blowing a whistle, ringing a bell, or flashing the lights on and off, to indicate that a new challenge is about to be given.

Prompts

Task 1: Allocate Your Budget

Your project plan has been approved for funding and you can start gearing up for your expedition. Funders have pledged $100,000 for your expedition. You have three weeks to complete your expedition. If you run out of time, you will be unable to complete your mission. Review your project plan and create a budget showing how the money will be divided among the different budget categories you identified.

Challenge 1: Funding Cut

The funders have cut your funding! Only partial funding of $75,000 actually comes through to fund your expedition. Will you cut your budget? If so, where? Will you delay the expedition to search for more funding? If so, how will that delay affect your final budget? Create a revised budget reflecting the new level of funding.

(Give students time to discuss their decisions in their groups and to record their decision on a cascading consequences diagram.)

If your group reallocated your budget, good work and congratulations! You're on your way to explore.

If your group delayed to seek more funding, congratulations! You have received an additional $50,000, bringing your total expedition funding to $125,000. However because you delayed, you have lost one week of expedition time, meaning you only have two weeks remaining to complete your mission. Further delays could mean you might run out of time.

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Expedition Simulation, continued

Task 2: Assign Expedition Team Member Tasks

Now that you have a final budget, it is time to finalize your team and prepare for your expedition. Consult your project plan and review which key team members are responsible for which areas of the expedition. Determine which specific tasks each team member will take on within each area of the expedition. (For example, groups should identify which team member will be responsible for piloting the submersible, either in person or as the driver in case the group has elected to use an ROV. Groups could also specify who will be reviewing biological data, operating communications systems, providing technical support for communication systems, performing mechanic repairs to the exploration vehicle, etc.)

Challenge 2: The Sick Pilot

Two days before the dive, the person in charge of piloting or driving the submersible is hospitalized. Will you replace him or her and continue with the original schedule? Or will you delay the expedition and hope he or she recovers? (Prompt students to think about which other team members might have the skills needed to take on the ill person's responsibilities and how the original responsibilities of all affected team members might need to be shifted. What impact might their decision have on their timeline and budget?)

(Give students time to discuss their decisions in their groups and to record their decision on a cascading consequences diagram.)

If your group chooses to replace your original pilot, you remain on schedule and on budget. However, you must reorganize your team member responsibilities by eliminating one task you assigned to a team member.

If your group chose to delay the expedition, your original pilot makes a full recovery. However, you must delay your timeline another week.

Task 3: Make a Data Plan

It is the day before the dive, and it's time to consult your project plan and review the data you will need to collect. Determine the best plan for data collection in the six hours you will have at the bottom before you need to surface. How far will the vehicle travel to collect data? Will you survey the area before collecting any data or collect data as you go? Will you collect all data from one location and then move on, or will you collect a single type of data first? Map out your data collection plan to use your time as efficiently as possible. (Students can determine how far they can travel based on the type of exploration vehicle they identified in their project plan. As they work, remind students that it is possible they might not dive directly into an area that has much life available for study.)

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Expedition Simulation, continued

Task 4: Create Dive Checklist

Preparations are finally complete, and it is time for the dive. Come up with a basic checklist of things that must be done and checked before the dive begins. (Checklists might include checking ocean conditions, lowering the exploration vehicle into the water, performing systems checks, etc.)

Challenge 3: Communication System Failure

The vehicle is in the water ready to dive, but a communication system malfunctions. This system is not necessary to drive the sub, but it does increase the risk to the pilot or the risk of losing the ROV, as communication with the surface is unreliable. Will you go through with the dive or postpone it?

(Give students time to discuss their decisions in their groups and to record their decision on a cascading consequences diagram.)

If your team chose to postpone the dive, you are able to repair the system, dive the next day, and have the full six hours on the bottom. However, you spend $10,000 on fixing the issue. Readjust your budget to accommodate this cost.

If your team chose to go through with the dive, you make it to the bottom safely. However, because of the systems failure your team now only has half of the time you planned for to explore. Prioritize your data collection by eliminating half of the data you planned to collect from your plan. What do you need to consider as you determine your priorities for collecting data?

Task 5: Process Your Data

Despite all the challenges, your vehicle has made it to the bottom of the ocean and back! It's time to process your data. Write one or two summary sentences about the data you were able to collect, how you intend to study it, and how you will plan to share your findings with the world.

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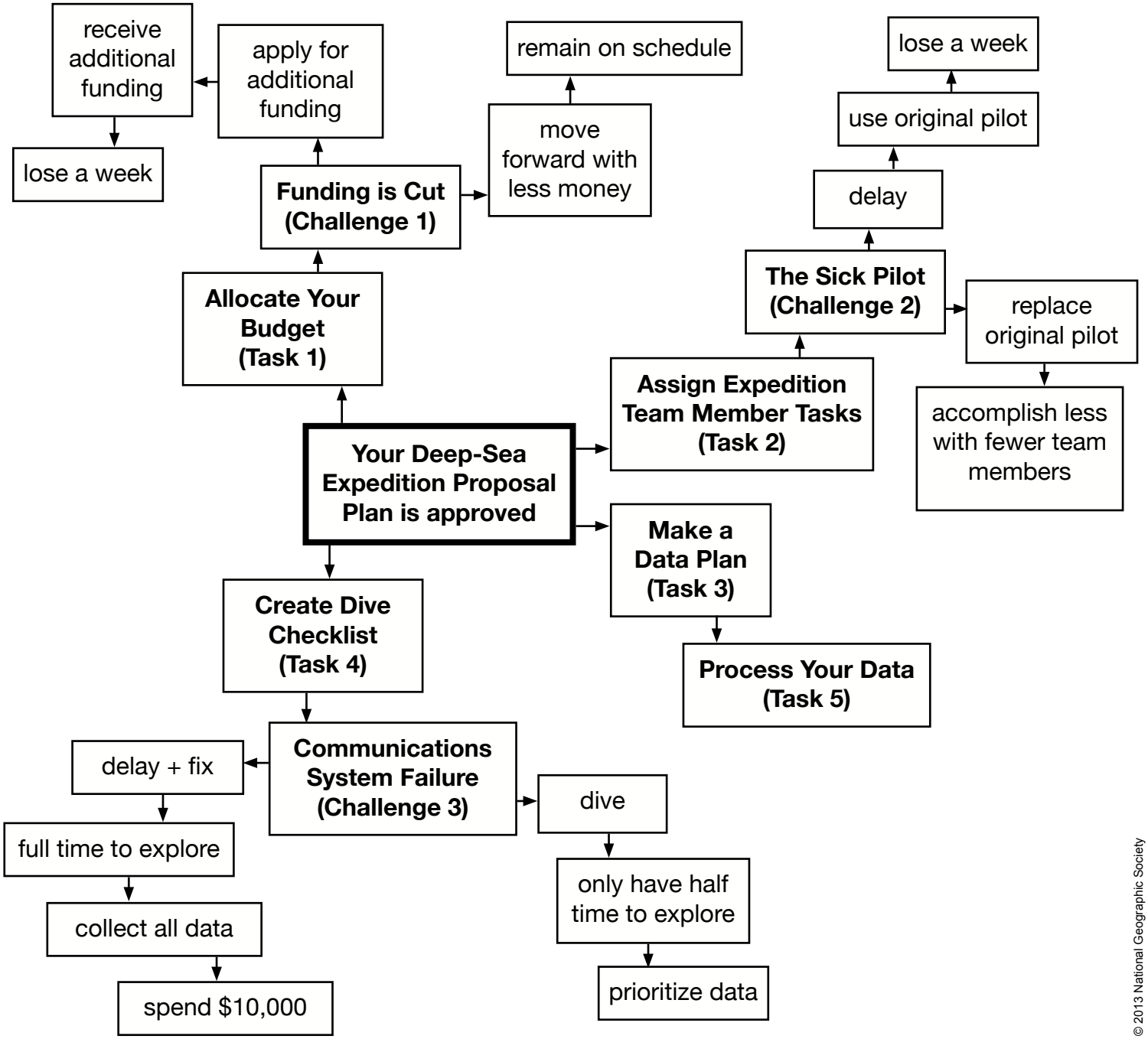
Expedition Simulation, continued

Below is an Expedition Cascading Consequences Diagram. Students diagrams should reflect this, but can also include additional information.



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