Lesson 2 - Student Activity #2 Guide
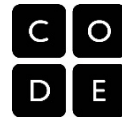
Inspecting the Water Pumping Model

Look under the Hood
Now we are going to get to know the code that makes up the base model!

1) Open your saved StarLogo Nova Water Pumping base model.

2) Navigate to the code section.

3) Use the **Model Observation Form** as you and your programming partner take turns looking at the code. (Remember to use your **driver** and **navigator** roles and switch roles from time to time.) Complete the form by running the model and looking at the code.

4) Which part of the code have you and your partner been assigned?

5) Write down what the code in your assigned section does.

6) Diagram the program's execution loop.

Here is a tip:
 ● You can refer to your StarLogo Nova Command Blocks and CS Concepts reference sheets from Module 1.

Lesson 2 - Student Activity #3 Guide

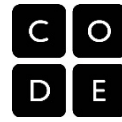## Adding a Slider for Evaporation Rate

Adding a Slider
In Activity 2 you edited the code to change the evaporation rate. In this activity you will learn a better way to change the evaporation rate.

1) **REMIX** your model and edit the name to "Water Pumping base model *your name your partner's name* **mod1**"
2) Add a slider for the evaporation rate and all necessary code.

3) Write down the slider settings you set.

4) Run an experiment using the evaporation rate slider. Use the **Experimental Design Form** to design your experiment first.

5) Record the data from your experiment and summarize your results.

Here is a tip:
   ● You can write up your results on a separate piece of paper. You can use graphs and/or tables to help you.

When you are done, upload and share your project.
Don't forget to put both partners' names in the project title.

Lesson 3 - Student Activity #1 Guide
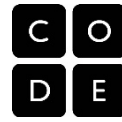
Adding a Water Pump

In this activity, you will be adding a new pump that pulls water from the aquifer. Review what you know about how the first pump was created.

1. Open up your version of the base model. **REMIX** and rename the project with ***your name your partner's name* mod3**"

2. Use the **Model Design Form** to plan your modification.

3. Get coding!

4. Test your model to make sure it is working correctly.

Here are a few tips:
- Remember to use the **driver** and **navigator** roles and switch with your programming partner regularly.
- Ask for help if you need it.

When you are done, upload and share your project.
Don't forget to put both partners' names in the project title.
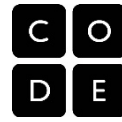
Lesson 3 - Student Activity #2 Guide

Running an Experiment

In this activity you will use your new model to run an experiment.

1. Use the **Experimental Design Form** to plan your experiment.

2. Record your data and analyze your results.

Here is a tip:
- You can write up your results on a separate piece of paper. You can use graphs and/or tables to help you.

Lesson 4 - Student Activity #1 Guide

Computational Science and Designing Your Project

Design your project

In this activity you and your programming partner will come up with your own model based on the Water Pumping base model.
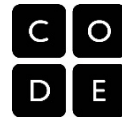
1. Open up your version of the base model. **REMIX** and rename to "Water Pumping ***your name your partner's name* NEW**"

2. Use the **Project Design Form** to plan your modeling.

Here is a tip:
- Try to think of things to put in your model that will help you answer your question, but keep it simple!

When you are done, move on to Activity #2.

Don't forget to put both partners' names in the project title.

Lesson 4 - Student Activity #2 Guide

Designing and Developing Your Model

Code your model
In this activity you and your programming partner will put your planning into practice and you will make your new model.
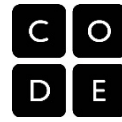
1. Open up your model ("Water Pumping *your name your partner's name* **NEW**")

2. Use the **Project Design Form** to guide you as you take turns **driving** and **navigating**.

Here is a tip:
- You can copy and paste code from other models to help you work more quickly.

When you are done, upload and share your project.
Don't forget to put both partners' names in the project title.

Lesson 5 - Student Activity #1 Guide

Completing and Debugging Your Code

Debug your model

In this activity you and your programming partner trace execution of your model and use **debugging** to fix any issues you find.
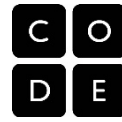
1. Open up your model ("Water Pumping ***your name your partner's name* NEW**")

2. Test your model out and fix any issues you find.

Here is a tip:
- ● Try to look at the code and model in sections to avoid getting overwhelmed.

When you are done, move on to Activity 2.
Don't forget to put both partners' names in the project title.

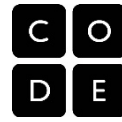## Lesson 5 - Student Activity #2 Guide

Running Experiments

In this activity, you and your programming partner will use your new model to run experiments.

1. Open up your model ("Water Pumping *your name your partner's name* **NEW**")

2. Use your **Project Design Form** to guide your experimentation.

3. Record your results and perform **Data Analysis** on them. Record your conclusions.

Here is a tip:
- You may need to modify your experimental design, now that you have finished your model.

When you are done, start preparing your results for a presentation.
Don't forget to put both partners' names in the project title.

Student Activity Guide

Preparing Presentations

In this activity, you and your programming partner will prepare a ten-minute presentation using tools like slide presentation and a projector. Follow the guidelines below:

1. State the question you were seeking to answer or the problem that you were studying.
2. Tell us about any background research you did on the topic.
3. Tell us about your model (what's included and what was left out).
4. Tell us about your experimental design.
5. Show your model running and how you collected data.
6. Show any collected data and analysis.
7. Tell us about any relationships you noticed between variables that help you understand or predict the phenomenon.
8. Summarize your findings; what was the outcome of running your experiments?
9. Do you think you learned anything about the real world?
10. Show us a piece of code you are proud of.
11. Allow time for questions and answers.

Here is a tip:
- Take turns presenting different sections. Plan on going between the presentation (slide presentation, for example) and the model.

When you are done, practice your presentation with your partner.
Don't forget to put both partners' names in the project title.